



FRIDAY, FEBRUARY 11, 1876.

Contributions.

The Pennsylvania-Texas Pacific vs. the Southern Pacific Railroad.

OFFICE SOUTHERN PACIFIC RAILROAD COMPANY,
SAN FRANCISCO, January 25, 1876.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. C. P. Huntington in his letter to you, of Dec. 15, very clearly and courteously set forth, (1) the mistake of your correspondent who alluded to the Southern Pacific Railroad as a "branch of the Central Pacific," and (2) a truthful account of the damage sustained by the Southern Pacific Company by the failure of the Texas Pacific Company to have its road built so as to connect at the eastern boundary of the State of California, as stipulated by the national charter common to both companies, and (3) a very calm remonstrance against the proposition of that company to secure Government aid for a double line of railroad across Southern California, to be used in competition with that already built by that company from its own resources.

Mr. Frank S. Bond, who signs himself as "Vice-President of the Texas & Pacific Railroad Company," in the hope, I suppose, that it may help his road to the desired aid, replies in your issue of the 8th inst., in an attempt to break the force of these positions. He does not traverse the material points at issue, viz., the failure of his road to build its road as agreed; nor deny the proposal to build a duplicate line if Government aid is granted. He has the temerity, however, to assert, without offering a shadow of supporting proof, that the land grant made to the Texas Pacific Company by the United States is not lapsed or lost, "but is to-day a vested property of that company, without taint of forfeiture." A reference to its charter hereunder is a sufficient answer to this statement. Following the traditional advice given to the lawyer who had "no case," he does, literally, "abuse the plaintiff's attorney," by dragging in a series of misrepresentations, born either of ignorance or malice, in regard to Mr. Huntington's private business and investments—which, while they affect the points in the controversy neither one way nor another, do absolve me from all delicacy or hesitation in alluding to the affairs and outside engagements of his superior officer, the President of the Texas & Pacific Railway Company. Tempting and abundant as is the field here opened by this servant of more zeal than discretion, I forbear to investigate it, for the reason that it would be discourteous, and it is not necessary to the integrity of our position.

For the lack of better support to the subsidy scheme of Mr. Bond's late associates in the Texas Pacific, it became necessary to assert that competition to the Pacific is urgently demanded and, therefore, Government should provide the means for another road. This ignores the fact that there are two water-routes always in operation, giving a closer competition than any new road ever can. But if this plea is admitted to weight in this case, should it not go much further? Why may it not be invoked to finish the Atlantic & Pacific Railroad along the 35th parallel, and the Northern Pacific along the 47th; or to provide new lines between New York and Chicago or St. Louis? At all events, it might be invoked in the courts of New Jersey to vindicate the rights of competing routes between New York and Philadelphia and Baltimore, where the same parties who at Washington are demanding aid for competition, are at Trenton trampling under foot the plainest statute law and endangering life, in order to prevent it. The trouble with this plea of Mr. Bond's is that, if admitted at all, it goes too far for his purpose, and has, besides, a disagreeable recoil.

The advocates of the Texas Pacific Company appear to think it necessary, also, to establish a case of "grinding monopoly" on the part of the completed Pacific railroad. This is difficult to do in the face of the fact that the Union and Central Pacific railroads have long been furnishing the cheapest railroad transportation in the country, I believe, and certainly the cheapest considering the character of the country they traverse, and the greater cost of maintenance and operation. But without citing any facts to establish it, they make the extraordinary assumption that in order to retain this monopoly of through business (for, of course, it could not diminish, but might increase, the local), the Central Pacific is trying to prevent the construction of a second overland line. To this Mr. Huntington replies, that so far from preventing the construction of a second line, some of the leading capitalists of the Central Pacific have given their assistance and the benefit of their experience to their neighbors of the Southern Pacific, so that they may, together with the Texas connections, establish a second line at the earliest possible day. This they have done, primarily, because it offered a prospect of a good investment, and incidentally, because it would bring new local business to their road, which is the chief source of its profit. The latter company have employed more men, expended more money, and laid more road than any other, or more than all other, Eastern companies toward this new Pacific road. Whereupon Mr. Bond now comes forward with the preposterous statement, inconsistent with the first position, that the Central Pacific are so willing to have another road across the continent as to undertake the building of it, at a vast expense, across an unsettled country, in order to enjoy, with two roads, the same traffic they now have on one! He will have great difficulty, I think, in persuading anybody either that the overland traffic is so enormous as to justify the building of a second line at present, or that the astute managers of the Central

Pacific are so blind as to furnish two sets of rails where one would suffice.

I am not, and never have been, an officer of the Central Pacific Company, and, therefore, that company needs no defense from me; but I have been attached to the Southern Pacific from its earliest stages of growth; and I can say that, though the relations between the two corporations are friendly, and at certain points their roads are worked in harmony, since there are no conflicting interests in regard to the local traffic in the territory the lines respectfully serve, yet their organization, revenues, management and accounts are entirely distinct and separate, nor do I know of anything which should prevent them, after the Southern Pacific is connected with the East, from being worked independently, or, if necessary, in competition. The few men who are interested in this company who are also interested in the Central Pacific are not immortal, nor are their relations so permanent that nothing can disturb them.

Mr. Bond thinks he finds some support for his hare-brained theory in the fact that the local business of the Tulare and Los Angeles divisions of the Southern Pacific is, for the present, brought over the San Joaquin Branch of the Central Pacific into this city, until this company has completed the main line, via the Salinas Valley, and made its own independent connection. This is much as if the Canada Southern and Baltimore and Chicago roads should be identified with the companies on whose tracks their business finds its way into Chicago, until their own lines are extended thereto.

But Mr. Bond is ignorantly or wilfully wrong in his geography; and while he may be excused for ignorance of California, he is not excusable for the wrong deductions he makes in regard to the purposes and motives of this company. These flow (rather awkwardly, it is true) from his fundamental version of facts, that the Southern Pacific road is part of the Central Pacific. For instance, he asserts that the line now extending directly from this city via San Jose to Soledad, 143 miles, has been abandoned as a local road, whereas it is, in fact, the main stem line of the Southern Pacific. He can be easily set right in his topography. He ought to know that the Northern Division of our road, extending from San Francisco to Lerdo, lies nearly parallel with the San Joaquin Branch of the Central Pacific for its whole length; but that a prominent ridge of mountains, just high and rugged enough to forbid passage by ordinary roads, separates them, and, therefore, the two systems are quite independent of each other, so far as local traffic is concerned. Both occupy a series of broad, open, cultivable valleys, among the finest and most productive in the State, and are about equally easy to build railroads over—the Gabilan range being crossed at the Southern or Polonio Pass with about the same facility as the Diablo range is crossed by the Central Pacific through the Livermore Pass at the other end. Neither of them crosses the Sierra Nevada range at all, as Mr. Bond seems to think, until they reach the Tehachapa Pass, which is on the line of the Southern Pacific; and there is not even five miles of difference in the distance between this city and Lerdo, the point in the Tulare Basin where they again converge.

Mr. Bond is concerned why the Northern Division, between the present temporary terminus at Soledad and the other portion of the main line in the Tulare valley, has not been built; and he ventures the opinion that "it will not be built this century." Here his false postulate has again led him astray. I can inform him that it will be built, in order to open up and accommodate the rich country, and to accommodate the business thrown on it from the Salinas, Tulare and other valleys in Southern California, even if the through connection to Texas should be delayed indefinitely; and the reason it is not now extended much further than it is, is because, according to a certain Act of Congress, approved March 3, 1871, the Texas Pacific Company engaged itself to have its road in the vicinity of Fort Yuma within a specified time, and the Southern Pacific Company, by the same Act, also engaged to have a line in the same locality, so as to afford a through connection to San Francisco, over any lines, either of its own or of other companies.

Supposing that the Texas Pacific Company would be as good as its word, the Southern Pacific Company mustered its resources and put on a heavy force on the portions most necessary to establish the earliest practicable connection. These were not, as Mr. Bond insinuates, the easiest parts, but involved much the hardest and most difficult work on the whole line; that portion between Caliente and the summit of the Sierra Nevada at Tehachapa being more costly than any equal distance in crossing the same range by the Central Pacific, to say nothing of the crossing of the minor ranges on either side of Los Angeles, which involves, among other outlays, one tunnel of 7,000 feet, and all of which is now ready for the track. The connection of the main line with the San Joaquin Branch, which would have to be made in the interests of this company at some time, was made with about 50 miles of road, whereas the extension from Soledad required 160 miles, and consequently more valuable time.

Had we foreseen that the Texas Pacific would abandon its work, default in its engagements and ask further assistance at the hands of the government, this company might have continued its line up the Salinas instead of building across the plains east of the Southern California settlements, where there is but a scanty support (without a through overland connection) for a single line, and certainly not enough to justify the second parallel road contemplated by the subsidy company.

This plan, however, supposing that the Texas Pacific had kept its engagements and had its road at the Colorado, as per agreement, would have left San Francisco without a connection, as all the available forces at our disposal would have been employed in building a line parallel, so far as through traffic is concerned, with one in operation on the other side of a dividing ridge. This, indeed, may have been just the contingency desired by the Texas Pacific managers.

I am at a loss to account for the extreme solicitude of Mr.

Bond as to whether the through business to San Francisco shall enter on the east or west side of this range of hills, or whether it is over roads owned wholly by a single corporation or by two or more, and why he should insist on two lines being built over this thinly-settled country, where one will suffice to do the business. So far as the public and travelers and shippers are concerned, it can make no earthly difference as long as the time and rates are the same. If the roads between here and the Colorado were expected to be built out of the public treasury, it might then be a matter of public concern; but even then the welfare of California and this city could not be more advanced than now.

It is the special pride and care of this company to see that so far as lies in their power San Francisco suffers no detriment which it can prevent. Inasmuch as the Texas & Pacific road does not propose, even with the help of the government, to build its road to San Francisco, but to make its terminus at a small town in the extreme southwest corner of the State, remote from the paths of trade, and without back country to support it, its solicitude about San Francisco may be more sham than real. It appears that, in an hour of madness, the confiding citizens of San Diego were over-persuaded, by the President of the company, to tax themselves to a large amount, to give their lands and privileges to the Texas Pacific in the promise that their little port should be made the terminus of his road. Can it be that a desire to build up and improve the 11,000 acres of this wild land should impel the managers to divert their road 200 miles away from the true course of trade (and of course an equal distance back again), and thus found a city which should be a rival to San Francisco? Have we not here a key to the ambitious plans of the Texas Pacific managers, which accounts for much of their subsequent mischances, in vain efforts to bend the currents of trade from their natural channels for their own enrichment?

It is patent to all the world that the road from the East, with which that charter contemplated a connection, is at a standstill in the eastern part of Texas, and cannot, it is averred, meet our road for many years to come. Our right to build to the eastern boundary of California on this line no one disputes; our duty to do so within a prescribed time was assumed with the understanding that we should be met there by a road from Texas. We are not only not met there, after vast outlays in the expectation of a remunerative through business, but the unjust demand is made for government assistance to the extent of \$35,000 a mile, with which to build another road over this same ground, under the ownership and control of a company which is doubly in default toward the government. We cannot believe Congress will knowingly sanction such an invasion of our rights, and such a return for our faithful observance of our part of the original contract.

A word or two in regard to the proper means of completing this Thirty-second Parallel Pacific Railroad. The President of the Texas Pacific Railroad professes to be unable to complete it without further assistance from the government. How that may be I know not; it is certain that he cannot do so within the time called for by the acts. The disability of his company does not spring so much from causes which have intervened since the provisions of the law were accepted, I imagine, as from a failure to command the confidence of capitalists on both sides of the Atlantic in their management. The President, Mr. Scott, is the chief manager of a system of roads lying along the States north of the Potomac and the Ohio, whose boast is that it embraces more than 6,500 miles of track, and whose liabilities amount to over \$400,000,000, or fully ten per cent. of the aggregate of all the capital in railroads in the country; he has large experience in the money markets and ought to be able to call to his assistance all the capital needed, especially as the 1,000 miles of road, more or less, he has undertaken, is so located and connected with the older system of roads in which he and his friends are large owners and controllers, by leases or otherwise, as to be directly tributary thereto, if, in fact, this extension westward to the Pacific Ocean was not expressly designed as a feeder thereof. Had his company pursued the proper course, there can be little doubt that he would have done so; and, by a revolution in his method of doing business, might even do so yet, without begging the favor of the government. At all events, it would be but a slight percentage on the present capital for his numerous associates to contribute toward the Texas Pacific, which is to benefit their present investments.

Another objection is found in the fact that there is and can be no effectual guaranty that after receiving the aid now asked, the same company will not make a fresh default, and be again asking for further indulgence, or, what is more probable, throw upon the government the burden of completing and maintaining the road in operation. This could only be done, however, by the nation assuming the responsibility for the principle of the guaranteed bonds, as well as the interest, amounting to three or four hundred millions of dollars, if not also of the unendorsed liens now resting thereon. It is quite demonstrable that the aid asked for, unless used with more judgment and economy than the past career of this company warrants, will not suffice to construct the road and pay interest on its bonds until the revenues growing out of an enlarged through business will be sufficient to meet it; and the only safe way for the government to escape a contingent liability for immense sums through this company is not to appear on its paper at all.

The latter objection is fatal; but it is not all. The road will be built at no distant day without further assistance from the United States. Measures are now on foot whereby one or more of the several companies whose lines cross Texas will, with the aid of the States bordering on the Gulf and Lower Mississippi, and such other resources as they can secure, extend their lines from Galveston, New Orleans, Vicksburg and Memphis to the Rio Grande, at which point, or further west, they will be met by the Southern Pacific, building on the same line from California, and so establish a short and serviceable

line between the Pacific and Gulf ports, whose Eastern ramifications shall be on Southern territory. There is, therefore, no necessity for the national assistance, nor safety in granting it.

Senator Hamilton, of Texas, has introduced a bill setting forth the equity, power and duty of Congress to so amend the acts relating to the subject as to allow the Texas and California corporations to build until they meet and connect, and to devote the lands heretofore granted to that purpose. The preamble to that bill fully substantiates the forfeiture of these lands and the right of Congress to make this simple amendment, which is all the action on the part of the government which is called for as necessary to provide the road.

J. L. WILLUTT, Secretary.

Interlocking Signals and Switches.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I beg leave to submit to the criticism of such of your readers as are interested in the subject of interlocking switches and signals some suggestions, engendered largely from perusal of your recent lucid description of the system employed by the New York Central & Hudson River Railroad Company, at Spuyten Duyvil.

It seems possible that, inasmuch as signals can be changed from white to red, and vice versa, by simply opening and closing electric circuits, the latches by means of which switchlock levers are secured and released may be made to act as circuit-breakers and closers, with the effect of eliminating all signal levers from the locking frame, and simplifying, as a consequence, the operations of the signalman, and lightening his labor.

Fig. 1 represents one way in which the latch of a switchlock lever may be made to open and close electric circuits: *a* is a flexible insulated wire, *b* a rigid insulated wire attached to the catch-rod of the lever, and *f* a fixed insulated wire, *c* and *d* are insulators, the former attached to the catch-rod, the latter to the sector. The circuit is closed only in the back position of the lever, when the buttons in which the wires *b* and *f* terminate are brought into contact at the point *e*. A similar point of contact may of course be had in either or both of the other positions of the lever.

A simpler method of opening and closing circuits, which admits of using fixed wires entirely, consists in jaws attached to the sector—brought together by pressure of the catch-rod, and forced apart by springs when the catch-rod is raised. The jaws, however, could be brought into contact by hand pressure or otherwise; while with the arrangement represented circuits cannot be opened or closed in any irregular manner.

It is evident that a signal and any number of such levers which it is desired to work in consonance may be so connected by an electric wire that every one of the levers must be in its normal position in order to close the circuit and make the signal white, and that the lifting of a latch preparatory to unlatching any one of the switches will at once open the circuit and change the signal to red. A key—which in its normal condition is open—connected upon the same circuit, will allow the signal to stand at red when the switches are right, and upon being closed will change it to white, provided none of the switches are misplaced, in which event closing the key will not close the circuit, since it will be open at another point, and the signal will remain red.

A branch track signal circuit does not require an open key, since the circuit may probably be closed by the levers and the signal be white when all the switches are right for the branch, but the same levers must also break the circuit which insures the maintenance of the main line signal at red.

This method of connection, then, constitutes in itself a virtual system of interlocking between switches and signals, and does away with the necessity for any interlocking by mechanical means, other than in some exceptional cases of special signals, and where it is desired to make one switch lock another. A simple method by means of which any switchlock lever may be made to lock mechanically any other, in connection with electric interlocking as already explained, is shown in Fig. 1; *g* and *h* are links enabling the locking lever to impart a rolling motion to the shaft *i*; *k* is the lock and *j* a lug with which it engages—the former keyed to the shaft, the latter bolted to the lever to be locked.

The probability is so great that the practice of interlocking switches and signals will sooner or later largely prevail upon American railways that it is perhaps pertinent, at this time, to consider in what manner such systems may be made to combine, in the greatest degree, efficiency and simplicity in construction and operation.

The use of electric signals, if they can be successfully operated somewhat in the manner described, promises to conduce so much to these desired ends that it will doubtless be of interest to continue the investigation somewhat further by considering the principal details involved, in order that the question of practicability may be fully laid open to criticism. The most usual application of electric signals to railways involves the use of track instruments operated by passing trains, and the occasional failure of such systems has been due to the imperfect construction and operation of these and other appliances, which it will be unnecessary to use in any form in the case under consideration. The operations to be performed bear, as will be seen, a striking analogy to the ordinary method of transmitting telegraphic messages, without, however, the attendant difficulty of preserving the insulation of long lines of wire. It is a well-known property of electricity that an insulated conducting wire may be so wound around a bar of soft iron, bent in the form of a horse-shoe, as to render the latter sufficiently magnetic to attract an armature or piece of iron suspended near it, whenever an electric current, of the necessary intensity, is passed along the wire. When the current ceases the bar loses its magnetism, and the armature falls, or is forced back by means of a spring. An instrument, called an electro-magnet, constructed upon this principle, may be recog-

nized in any telegraph office, and plays an important part in the business of the line. Thus, the operator at a sending office, being provided with a key which enables him to allow an electric current to pass through the electro-magnet in a remote receiving office and to cut it off at pleasure, causes the armature in the latter office to fall and rise noiselessly, in consonance with the combinations of long and short strokes and varying intervals by which he indicates to the practiced ear of the receiving operator conventional signals, representing letters and words. This is the familiar process of sending and receiving a telegraphic message. The method of working electric signals is in many respects similar; for, as to speak, the signal cabin is the sending office, the latch of a switch-lock lever is the key, the signal station is the receiving office, where is placed the

levers in the closed circuit system, and does not seem capable of producing the effects necessary in interlocking switches and signals, where it is a cardinal requirement that the step preliminary to the misplacement of any lever must change the controlling signal, if white, to red; or, if red, retain it so, regardless of any other operations which can be performed, short of the restoration of that particular lever to its "right" position. Probably no plan is adequate to meet this requirement effectively where electric circuits are employed other than that in which a signal is made red by opening a circuit at any one of a number of points, and in which it can only be white when all these points are closed. It is a very bad feature of the open circuit system that derangement of the apparatus, as the breaking of a wire, is just as apt to leave the signal white as red.

The reliability of closed circuit signals, operated in the manner described, depends upon several conditions which will be briefly cited.

(a). *There must be no uncertainty in the method of closing the circuits.* The circuit-closer which it is purposed to employ, consisting of a metallic button attached to the lower face of a catch-rod, forced down by strong pressure upon an anvil occupying a sector notch, is similar in principle to the Morse key, or transmitter, used in all telegraph offices, and, properly constructed, will prove thoroughly efficient.

(b). *The mechanism which actuates the signal must be strong and durable.* The signal consists of a framework, of light iron or brass pipes, having its sides covered alternately with red and white flannel. If the size of each face is $1\frac{1}{4} \times 2\frac{1}{8}$ in., the signal will weigh about six pounds. The working parts are simply required to overcome the resistance due to the pivot friction of this weight, not to carry it, and no difficulty will, evidently, be experienced in adopting proportions which will insure durability under so inconsiderable a service. The signal must, of course, work in a case with a glass front. A lamp is suspended in the center of the signal in such manner that its weight is carried entirely by the top of the case.

(c). *The weight must be wound up regularly.* The length of the wire upon which the weight is suspended is sufficient to give several hundred signals before becoming entirely unwound. The duty of winding it up devolves upon the attendant who lights and extinguishes the lamp; and to guard against neglect or forgetfulness upon this score, a simple but ingenious device is available—now applied to a system of electric signals working successfully upon an important line of railway—which renders access to the lamp impossible except when the weight is fully wound up, an arrangement which evidently insures the performance of this duty every morning and evening.

(d). *The battery must be properly proportioned and maintained.* The source of power for the electric signal is a galvanic battery, the same as in the case of an ordinary line of telegraph. Its maintenance, therefore, involves no complexity. The amount of battery required depends largely upon the proportions adopted for the working parts of the mechanism which turns the signal. For example, referring again to Fig. 2:

$$\begin{aligned} \text{Let } W &= \text{the weight} = 5 \text{ lbs.} \\ a &= \text{radius of shaft } X = 1 \\ l &= \text{length of arm } A = 20 \\ p &= \text{horizontal pressure of arm } A \text{ against shoulder } C, \\ \text{then } p \times l &= W \times a \\ \text{and } p &= \frac{W a}{l} = \frac{5}{20} = \frac{1}{4} \text{ lb.} \end{aligned}$$

Assuming that the resistance due to friction between *A* and *C* is equal to 2-10 of *p*, the weight which must be applied to the shoulder *C* to cause it to fall and release the arm *A*, is

$$2-10 \times \frac{1}{4} \text{ lb.} = 1-20 \text{ lb.}$$

This weight is opposed to the lifting of the shoulder *C* plus a resistance equal in amount, due to friction between *B* and *C*, making the total vertical force which must be exerted at *C* 1-10 lb. Assuming such proportions of leverage for the vibrating arm *F* that the vertical movements of the armature *E* and shoulder *C* are respectively 1-32 and $\frac{1}{4}$ of one inch, a magnet will be required of sufficient power to lift an armature weighing 4-10 lb., suspended at a distance of 1-32 of one inch from its poles. A liberal allowance of surplus power must, of course, be made in proportioning the battery and magnet. If less battery power or a larger value of *W* be desired, it is only necessary to increase the lengths of the arms *A* and *B*, all other dimensions remaining unchanged.

(e). *The insulation of the conducting wires must be preserved.*—Probably no signal will be located at a greater distance than one-half mile from the battery, and consequently the length of circuits required is so inconsiderable that they may be constructed with unusual care without involving great aggregate expense. It is suggested that, instead of the ordinary method of construction, wires insulated throughout their whole extent be used, strung upon stout poles not more than 100 feet apart. This will provide against the effects of the usual disturbing causes in a manner leaving little to be desired.

The specifications (a) (b) (c) (d) and (e) are conceived to embody the principal conditions upon which depends the successful application of electric signals to interlocking switches; and, since no requirements are involved which are difficult of realization, the practicability of what is proposed seems to invite belief. The indicated application of electric signals should be carefully distinguished from that where such signals are employed to "block" a track automatically, for, without saying that the latter arrangement is necessarily unreliable, it is evidently much more likely to become deranged than the former, which has no long lines of wire, no track instruments, and is, moreover, wholly and constantly under espionage of the signalman.

Dismissing, for the present, further discussion of electric signals, attention is asked to some general features of interlocking systems, in which the merits of the points involved seem to warrant some modification of the usual practices. All such systems, in which switch-locks are used, embody, as far as can be ascertained, the common fault that the switch-lock levers have, only two positions, locked and unlocked; and in

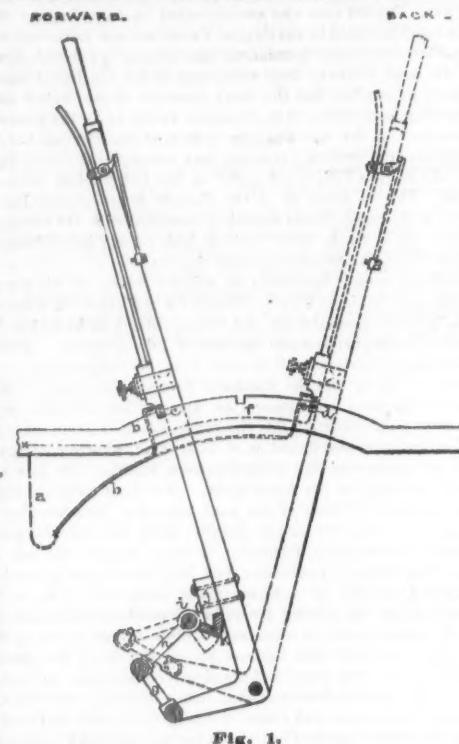


Fig. 1.

electro-magnet, whose armature, responding to the opening or closing of the distant key, releases by its slight movement the clock-work which actuates the signal. Fig. 2, without attempt at exact representation of detail, shows the general arrangement of the mechanism, by means of which these latter operations are performed.

D is the electro-magnet; *E* the armature attached to one extremity of the vibrating arm *F*, and *C* a shoulder attached to the other. When the armature is attracted the shoulder *C* rises, and upon cessation of the electric current falls a short distance, to a rest not shown in the engraving. *W* is a weight which causes the horizontal shaft *X* to revolve in direction of the dart whenever none of the arms, or spokes, *A A'*, *B B'*,

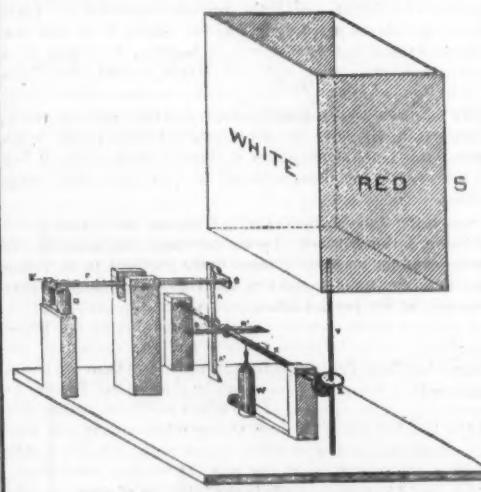


Fig. 2.

turning with the shaft, are in contact with the shoulder *C*. *S* is the signal which, by means of the shaft *X* and gearing *Z*, presents a new face with every quarter turn of the shaft *X*.

When the circuit is closed, as shown in the engraving, one of the arms *A A'* will be arrested by the shoulder *C*, and the signal will present a white face, but will turn to red when the circuit is broken from any cause, since in this case the shoulder *C* will fall sufficiently to allow the arms *A A'* to pass, and *B B'* to come into contact with it.

It will be noticed that the circuit remains closed whenever the signal is white.

A method slightly more economical in operation is that in which the clock work can only be set into motion by the closing of circuits, which break as soon as movement ensues, since chemical action of the battery ceases when the circuits are open.

This is known as the open circuit system. It requires, however, two wires for each signal, one to change it from red to white, and the other from white to red, while a single wire suf-

some cases, in addition, the locking bolt is driven home in precisely the same manner for both positions of the points (switch rails).

Advantages of the most pronounced character, irrespective of the kind of signals used, would result from giving the switch-lock levers three positions, viz., locked forward, unlocked, and locked back; and to the locking bolt two locking positions, corresponding respectively to the "right" and misplaced positions of the points.

1st. It is obviously desirable that the interlocking apparatus should be applied in a manner to preclude the possibility of the unlocking of any switch, much less its movement, out of its proper order, or until the controlling signal has been locked in harmony with its contemplated position. This end can be attained by applying the interlocking apparatus partly to the switch and partly to the switch-lock levers, where the latter have only two positions: or, more simply, by applying it entirely to the switch-lock levers, which must, however, have three positions to admit of this arrangement. The two indicated methods of interlocking can be best explained by means of a practical illustration.

In fig. 3,

a represents the switch lever.

b represents the switch-lock lever.

c represents the lever of the main-line distant signal *A*.

d represents the lever of the branch distant signal *B*.

Then, it being required to prevent the giving of a white signal when the line is fouled or switch unlocked, for the first case, where the switch-lock lever has only two positions:

x back (switch unlocked) locks *a* forward (signal *A* red).

switch lever, is suggestive to the perception of the signalman, and simplifies his operations.

3d. It is a prominent requirement of a thoroughly effective interlocking system, that it should prevent any irregular displacement of the points, however slight; and, consequently, where the interlocking apparatus is applied to the switch levers, as must be the case to some extent if the switch-lock levers have only two positions, the arrangement should be such that levers locking and releasing other levers invariably do so before being moved, and after being fully home in their

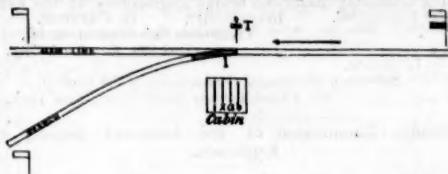


Fig. 3.

changed positions, respectively. Now, it is found that any system of mechanism which fulfills these conditions is necessarily complicated and expensive, while, if the interlocking apparatus be attached entirely to the switch-lock levers, necessitating only such change as will enable the latter to have three positions, some of the more simple appliances will prove quite as efficacious, which lock and release the levers near, although not exactly at, their home positions, since a switch-lock lever may be moved slightly without unlocking the points.

effect of simplifying the interlocking mechanism, admitting the use of a thoroughly efficient form of switch lock, and harmonizing, as a whole, the operations of the system.

The considerations involved in this discussion of interlocking switches and signals may be briefly summarized as follows:

I. Whether electric signals may not be used, with the effect of simplifying construction, reducing the number of levers, and lightening the labors of the signalman.

II. Whether it is not desirable to interlock by means of switch-lock rather than switch-levers.

III. Whether the movements of the switch-lock levers should not be in harmony with those of the switches—and

IV. Whether the position of the switch-lock levers should not indicate the position of the points.

It is deemed of interest to append an outline of the application to a particular case of such a system of switches and signals as has been described, and the site at Spuyten Duyvil, recently illustrated in the *Railroad Gazette*, has been selected as most available for the purpose.

The numbering of the switches and signals employed will be understood by reference to Fig. 5.

LIST OF LEVERS AND SIGNALS.

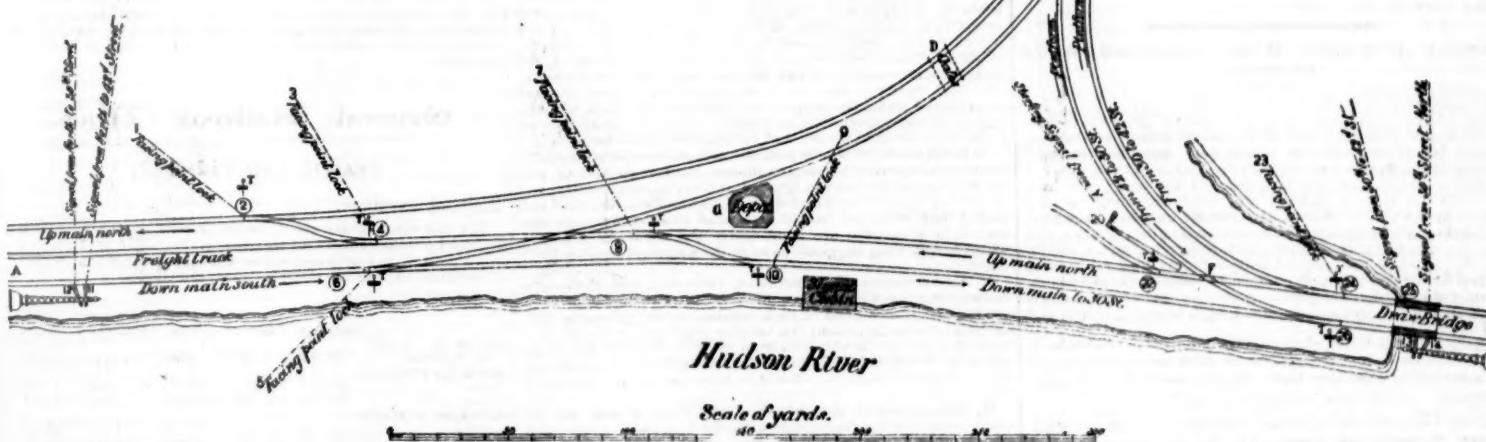
2, 4, 6, 8, 10, 18, 19, 22, 24, 26—Switch levers.

1, 3, 5, 7, 9, 17, 21, 23—Switch-lock levers.

25—Drawbridge lock and signal.

11, 13, 16, 20—Signals requiring no levers.

12, 14, 15—Signals requiring no levers, but an open key for each, by means of which their respective circuits, not otherwise interrupted, may be closed.



Hudson River

Scale of yards.

Fig. 5.

x back (switch unlocked) locks *b* forward (signal *B* red).
1 forward (switch set for main line) locks *b* forward (signal *B* red).

1 back (switch set for branch) locks *a* forward (signal *A* red).
a back (signal *A* white) locks *x* forward (switch locked right for main line.)

b back (signal *B* white) locks *x* forward (switch locked for branch).

For the second case, where the switch-lock lever has three positions, an equally efficient degree of interlocking will be attained if,

x forward (switch locked for main line) locks *b* forward (signal *B* red).
x back (switch locked for branch) locks *a* forward (signal *A* red).

a back (signal *A* white) locks *x* forward (switch locked for main line).

b back (signal *B* white) locks *x* back (switch locked for branch).

When *x* is in its middle, or unlocked position, it must, of course, lock both *a* and *b* forward, but as it already locks *b* when forward and *a* when back, no additional apparatus is required to make it lock them both when half way between these positions.

The complexity of the first method of interlocking, where the switch-lock levers have only two positions, has in some cases led to the adoption of the less efficient plan of applying the interlocking apparatus entirely to the switch levers. For example, in the system described in the *Railroad Gazette* of Oct. 16, 1875, the switch-lock levers are not represented as playing any part in the interlocking operations, and, consequently, the signalman is free to unlock any switch without regard to the position of its controlling signal, and there is nothing to prevent his giving a white signal to a train in case he has forgotten to lock a switch over which it must pass.

2d. If a switch-lock lever, locking the points, is forward when the switch lever is forward, back when the switch lever is back, and occupies an intermediate position when the switch is unlocked, its movement is in perfect harmony with that of the

4th. The proposed arrangement of three positions for each switch-lock lever permits the use of a switch-lock such that the fact of being able to move its lever in harmony with the switch lever is evidence to the signalman that the points have been moved; whereas, if the locking bolt is driven home in precisely the same manner for both positions of the points, the signalman, under conditions which obscure his view of the switch target, may mistake a breakage of some of the connections for a movement of the points, and lock them in one position, in the belief that they occupy the other.

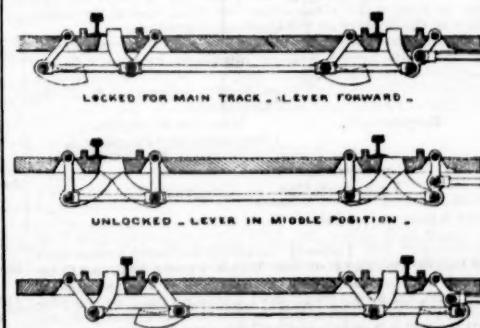


Fig. 4.

Several methods of locking suggest themselves in conformity with the above requirements. One of these, which is simply a modification of the admirable system employed at Spuyten Duyvil, is depicted in Fig. 4.

Here it is seen that the switch-lock lever is respectively forward, "out of gear," and back, when the switch is locked forward, unlocked, and locked back; and that the lock cannot be driven home, either forward or back, unless the points occupy corresponding positions.

It seems, then, that, without any apparent disadvantages, three positions can be given to the switch-lock levers with the

Under this arrangement it is seen that only 19 levers are required instead of 26 as at present.

Generally speaking, where electric signals are used, the number of levers required = number of switches \times 2—the number of trailing switches.

LIST OF CIRCUITS.

For convenience of reference, the circuits are numbered the same as the signals connected upon them.

Circuit 11, wire to signal 11.]

12, " " " 12.]

13, " " " 13.]

14, " " " 14.] When circuits are open signals are red.

15, " " " 15.]

16, " " " 16.]

20, " " " 20.]

ELECTRIC LOCKING.

Lever.	Circuit.	Condition of circuit corresponding to	
		Forward position of lever.	Back position of lever.
1	15	Closed.	Open.
5	11	Open.	Closed.
5	12	Closed.	Open.
5	14	Closed.	Open.
5	16	Closed.	Open.
7	14	Closed.	Open.
9	12	Closed.	Open.
17	11	Closed.	Open.
17	15	Closed.	Open.
17	16	Open.	Closed.
19	11	Closed.	Open.
21	14	Closed.	Open.
23	13	Open.	Closed.
23	14	Closed.	Open.
25	12	Closed.	Open.
25	13	Closed.	Open.
25	14	Closed.	Open.
25	16	Closed.	Open.
25	20	Closed.	Open.
26	12	Closed.	Open.
26	20	Open.	Closed.

The circuit closers are attached, it is seen, entirely to the switch-lock levers, except in the case of the trailing switches, 19 and 26, which have no locks, and the drawbridge lever, 25. Each switch-lock lever is forward when the switch is locked for main line, back when it is locked for the branch or side track, and midway between these positions when the switch is unlocked. The opening of a circuit occurs in each case simulta-

neously with the lifting of the catch-rod, before the lever is moved, and the closing of a circuit with the lowering of the catch-rod after the lever is in its new position. In the normal position of the switches, every lever being forward, all the circuits are open, circuits 12, 14 and 15 being opened by the keys previously mentioned.

No mechanical interlocking seems to be required.

In order to illustrate the working of the system, let it be supposed that it is desired to pass a train over the down main track to Forty-second street. It is then required to lock signals 12, 14 and 16 at red, set and lock switch 6, and change signal 11 to white.

It is seen from the locking table that all this will be accomplished, in proper order, by simply setting and locking the indicated switch.

Again, before the drawbridge is unlocked signals 12, 13, 14, 16 and 20 must be locked at red.

This, the table shows will be effected by the act of lifting the catch-rod of the drawbridge lever, preparatory to moving it. Other operations will be correspondingly simplified.

If a circuit should be accidentally interrupted, from any cause, the signal will, of course be locked in the red position—just as if the rod or wire working it by mechanical means were to break. If it be desired to supplement each distant signal by a so-called “home” signal, placed quite near to the outlying switches, both may be connected upon the same circuit, and no additional levers will be required. The distant signal will then present say a green face (caution), when the home signal is red, or both will be white at the same time. The application of electric signals to this particular case is seen, then, to result in the elimination from the locking frame of all the interlocking apparatus and nearly one-third of all the levers; to simplify every operation of the signalman; and, without increasing his labors or adding to the mechanism in the cabin, to admit the use of “home” in addition to the existing distant signals. The use of electric signals at the only other two sites, in this country, known to afford examples of interlocking switches and signals, could, in the one case, where six switches are operated, be made the means of reducing the number of levers from 20, as at present, to 11; and in the other, where the number of switches is ten, from 24 to 20, and of rendering unnecessary, in both instances, any mechanical interlocking.

Surely there is something in all this to warrant, upon the part of those who pay for systems of interlocking switches and signals, the considerations I. II. III. and IV., previously recited.

SAM'L. BUEL, JR.

NEW YORK, January, 1876.

Exhibition of American Bridge Construction at the Centennial.

The following circular has been issued:

The sub-committee appointed to promote a proper presentation of American bridges and bridge construction, at the Centennial Exposition, hopes to secure your assistance to make the exhibition in this respect, both creditable and complete.

American engineers have long enjoyed the prestige of having built the longest, boldest and most important wooden bridges in the world. Within the last fifteen years, they have turned their attention towards the erection of iron bridges, and already a distinctive American practice has grown up, which, in consequence of the marked improvements and progress of the last five or six years, is claimed by some of them to be in advance of European practice, in regard to economy of materials, facility of erection and possible length of spans, of iron and steel bridges.

This fact, if it is a fact, the committee desires to establish. It does not propose to supersede or to alter any arrangement which intending exhibitors have already made, and will make a separate exhibit of those contributions only which the parties furnishing them shall specially request it to take in hand. It intends mainly to secure such concert of action as shall lead to an adequate presentation of our recent progress, and shall best attract the attention of visitors while furnishing them any further information they may require.

For this purpose it is proposed to have an office, at which a secretary shall be in attendance, in some central part of the Exposition building, and to which visitors shall be referred and directed by cards appended to the individual exhibits. These cards, which are to be made as conspicuous as possible, should be appended to all the exhibits in charge of the committee, whether entered by the exhibitors themselves, or by the committee, and would refer whatever visitor might become interested by the object exhibited to the secretary in attendance, from whom he might obtain such albums, lithographs, circulars or cards, as the exhibitors shall wish to distribute; or, more important still, receive information as to the readiest way of visiting the works themselves, and becoming acquainted with their builders.

It is also proposed that the secretary shall keep a record of the names and temporary address of the visitors, in order that proper attention may be shown to them.

With these views the following suggestions are made:

I. That engineers, or others, who are in possession of models, plans or photographs of important or interesting bridges, whether of wood, iron or other material, shall prepare the same for exhibition, and append thereto the name of the contributor, and such description and information as may seem required. It is especially hoped that pains will be taken to represent the earlier bridges erected in this country, so as to give the exhibit an historical value. Arrangements may be made by contributors for exhibition, through the commissions appointed by the several States—but the committee will take charge of the models, plans, etc., if desired; obtain the necessary space, and group and arrange them so as to make the display as effective as possible.

II. That builders, manufacturers and designers of bridges, should prepare the following: 1st. Models, generally upon a scale of one-eighth or one-fourth of an inch to the foot (one-ninety-sixth or one-forty-eighth of real size), of such of the more important of their works, as they may desire to make known; together with full size, or half, or even quarter size models of the details of the joints and connections, especially those in which the American differs from the European practice. 2d. Original or traced drawings of the plans of the less important of their works, together with photographs representing the same, and whenever possible, the mode of their erection. 3d. Printed statements to be furnished to the Secretary for distribution, concerning the same. It is suggested that the most effective method of furnishing this information would be through illustrated albums, giving the location, date of building, description, spans, width and depth of trusses, weight and amounts of materials, loads assumed,

and factors of safety adopted, etc., of the bridges built or designed by them. These albums could either be given away or sold at about cost, to inquirers, as the contributors might direct.

It would greatly be preferred that this class of contributors should make their own arrangements for obtaining space, and display of their exhibits, but the committee will take charge of this at their expense, if required.

III. That parties who shall receive this circular, shall advise the Chairman of the Committee, at the earliest moment possible, as to what action they propose to take in relation thereto; or shall inform him in case they know of any parties who are in possession of any models or plans of bridges, which it would be desirable to exhibit, as well as favor him with any suggestions that may occur to them, as to the best method of representing creditably American bridge engineering at the Centennial Exposition.

Respectfully,
Chairman Sub-Committee, II,
Box 839, New York City,

G. LEVERICH,
Secretary Centennial Commission of the Society,
No. 4 East Twenty-third street, New York.

Centennial Commission of the American Society of Engineers.

The following is the circular of the general committee:

With the view of aiding in a proper representation of American engineering progress and practice at the Centennial Exposition, this Society, at its annual meeting, appointed a committee to consider the subject, and to take charge of this feature of the Exposition.

This committee has constituted sub-committees to present in proper form the progress of various branches of engineering, the more prominent features of which it is proposed to illustrate in a logical, consecutive method (not in any sense “popular”), for the information of engineers and experts in this country and from abroad.

It is believed that much good can be accomplished in this direction by an intelligent supervision of, and co-operation with the efforts of exhibitors to this end, on the part of the committee.

THEODORE G. ELLIS Chairman,
J. JAMES R. CROES,
ROBERT BRIGGS,
OCTAVE CHANUTE,
A. L. HOLLEY,
W. SOOY SMITH,
WM. P. SHINN,
Committee.
G. LEVERICH, Secretary.

SUB-COMMITTEE I—RAILROADS AND ROLLING STOCK.

PITTSBURGH, Pa., Feb. 2, 1876.

SIR.—Sub-Committee I, on “Railroads and Rolling Stock,” is charged with the presentation of the progress and present condition of American engineering as exemplified in our railroads, locomotives and rolling stock, excluding, however, bridges and foundations and masonry, which are committed to other sub-committees.

It is proposed that at the headquarters of the Society on the Centennial grounds, a secretary shall be present at all times when the Exposition is open, to give information on engineering subjects, to refer inquiring parties to the exact location of any object of engineering interest in the Exposition, to furnish desirable information in regard to such articles exhibited, and directions for reaching works where such articles are produced, etc.; and that after the close of the Exposition, a memoir shall be prepared under the auspices of this Society, which shall be historical and descriptive, in which it shall be our aim to set forth the wonderful progress of railroads in this country.

In furtherance of this object, the aid and co-operation of the managers, superintendents, engineers, master mechanics and car-builders of the various lines of railway in this country, and of the manufacturers and dealers in locomotives, sleeping and parlor cars, coaches, freight cars and railway supplies and materials generally, are respectfully and earnestly solicited with the following suggestions as to the means of making them effective:

I. Manufacturers of locomotives, cars, etc., and dealers in railway supplies, who may become exhibitors at the Exposition, are requested to append to their exhibit cards indicating that desired information about the articles exhibited or the place of manufacture, can be obtained from the Secretary of this Commission. Printed descriptions of articles exhibited, explaining their distinctive features should be furnished to the Secretary for distribution.

II. Manufacturers, etc., whether exhibitors or not, are invited to furnish the Committee with models, photographs and drawings of locomotives, cars, etc., made by them. Photographs should be arranged in albums for convenience of reference, with copies for distribution—to be given away or sold at cost, as contributors may require.

III. Superintendents and engineers of railways are invited to send to the Committee photographs of shops and stations, models or points, and other objects of interest presenting descriptive features, the photographs in albums preferred.

IV. Master mechanics and car-builders are requested to contribute photographs or models of locomotives, cars, machinery, etc., constructed or designed by them, having peculiar advantages, with printed descriptions thereof.

V. Parties having information not generally known, relating to the early history of railways in this country, are requested to communicate the same to the Chairman of Sub-Committee I, and the Committee would urgently request that drawings, models, etc., of machinery in early use on railways of this country be sent to the Committee for exhibition at the headquarters of the Society on the Centennial grounds.

VI. Parties receiving this circular are earnestly requested to advise the undersigned of their intentions in regard to the subjects herein presented.

Suggestions are invited from parties interested as to the best methods of realizing the object sought.

Respectfully,
WILLIAM P. SHINN,
Chairman Sub-Committee I,
Pittsburgh, Pa.

Transportation in Congress.

In the Senate on the 7th:

The Chair laid before the members a communication from the Secretary of the Treasury inclosing communications from Sidney Dillon, President of the Union Pacific Railroad Company, and C. P. Huntington, Vice-President of the Central Pacific, in regard to the creation of a sinking fund for the payment of the amounts which will be due the Government at the maturing of the bonds guaranteed by the Government, near the close of this century. The proposition of the Union Pacific Railroad Company was, in brief, as follows:

First: That the Government shall retain in the United States Treasury the amount (estimated at about \$900,000) then claimed to be due to the company for transportation and mail service, and that this sum, together with interest at six per cent., to be compounded every six months, should constitute a sinking fund to the credit of the company.

Second: That the company should pay into the United States Treasury \$250,000 every six months during a period of ten years, beginning July 1, 1876; \$375,000 every six months during the succeeding ten years, and \$500,000 twice a year, from and after July 1, 1896, until these payments, together with the interest on them, compounded semi-annually, added to the

rest of the sinking fund hereinbefore provided for, should equal the full amount of the Government mortgage, reckoned at simple interest to the same date.

Third: That the Government should retain each year, and credit to the company on account of the aforesaid payments, moneys due the company for the transportation and mail service, the company to make good any deficiency.

Fourth: That these payments should be in full settlement of all claims and demands by or on behalf of the Government against said company.

The proposition of the Central Pacific Railroad Company was identical with the foregoing, except that it offered a semi-annual payment of \$200,000, or \$400,000 a year, for the whole term of the sinking fund. Secretary Bristow says, with reference to these propositions:

“No definite action was taken by me in the matter, partly for the reason that Congress was about to adjourn, and partly on account of the inadequacy of the sums proposed by the companies, to be paid and retained in the Treasury as a sinking fund, in compromise of the claims of the Government against them. It seemed to me, however, that it was desirable to reach an adjustment whereby the vexations differences which had long perplexed the Government and largely affected the credit, if not the prosperity of the companies, should be finally composed. In reaching such a result, it is obviously for the interest of both, and especially the Government, that an arrangement should be made by which a fixed annual and semi-annual sum should be paid by the companies, so that when the principal of the debt becomes due the Government may hold in its treasury a large sum applicable to the extinguishment of debt. How and by what means, in what sums, and by what periods this fund should be obtained and applied is for Congress to determine. But it was and is my opinion that it would be a wise precaution to place corporations under a definite and binding obligation, with their consent, to set apart from their semi-annual earnings and deliver to the Government a reasonable and fixed sum, so that their managers might constantly feel the pressure of this duty upon themselves, and not be permitted to treat it as a matter to be looked to in the distant future or by a succeeding board of officers.”

Mr. Sherman, of Ohio, entered a motion to refer the above communication to the Committee on Finance, and Mr. West, of Louisiana, gave notice that he would move to refer it to the Committee on Railroads.

Mr. Howe, of Wisconsin, called up the bill to authorize the construction of a bridge across the Mississippi at Winona, and upon his motion further consideration of it was indefinitely postponed.

In the House, on the 7th:

Mr. Hunton, of Virginia, introduced a bill to aid the Washington & Ohio Railroad Company in the construction of its road to the Ohio River.

The bill introduced in the House by Mr. Tont, of Illinois, Jan. 31, to forbid the subsidizing of railroads by municipalities in the territories, reads as follows:

“Be it enacted, etc. That from and after the passage of this act it shall be unlawful for any Territory of the United States, or any county, city, town, township, or other municipal corporation within any of such Territories, to subscribe to the capital stock of any railroad company, or to the capital stock of any private corporation, or to issue any bonds, obligations, or other evidence of indebtedness, or in any manner bind the inhabitants thereof in aid of such railroad company or other private corporation.

General Railroad News.

TRAFFIC AND EARNINGS.

Railroad Earnings.

The following figures are from the report of the Wisconsin Railroad Commissioners for the year ending June 30, 1875, and include all the se companies whose annual reports or statements of earnings have not heretofore been published:

	Gross earnings.	Net earnings.	Earn. per mile.	P. c. of exps.
Galena & Southern Wisconsin ...	\$6,967	6,161	\$806	..... 68.43
Green Bay & Minnesota	300,883	329,498	*28,615	1,406 100.51
Mineral Point.....	104,725	134,168	*19,443	2,063 128.1
Sheboygan & Fond du Lac	109,222	105,783	*5,561	1,268 105.55
West Wisconsin....	803,100	740,564	62,536	3,515 92.85
Wisconsin Central....	590,754	363,333	237,421	2,009 59.81
Wisconsin Valley..	107,492	76,242	31,260	1,12 70.93

* Deficiency.

The Galena & Southern Wisconsin was in an unfinished state and under construction during the year. In addition to the current expenses the Wisconsin Central reports \$137,655 paid as rental to the Milwaukee & Northern and the Chicago, Milwaukee & St. Paul companies.

Other earnings are reported as follows:

Year ending Dec. 31:	1875.	1874.	Inc. or Dec.	P. c.
Atchison, Topeka & Santa Fe.....	\$1,520,358	\$1,250,806	Inc. \$269,552	21.5
Expenses.....	698,750	537,642	Inc. 141,108	25.3
Net earnings.....	\$821,608	\$692,164	Inc. \$128,444	18.5
Earnings per mile... 2,774	2,462	Inc. 312	12.7	
Per cent. of exps. 45.96	44.60	Inc. 1.36	3.0	
Midland of Canada....	284,323	303,603	Dec. 19,280	6.4
Northern Pacific....	618,590	.....	.....	.....
Expenses.....	466,450	.....	.....	.....

Net earnings.....	\$159,140	.....	.....	.....
Earnings per mile... 1,115	.....	.....	.....	.....
Per cent. of expenses. 76.40	.....	.....	.....	.....

Month of December:

Atchison, Topeka & Santa Fe.....	\$152,584	\$ 92,225	Inc. \$60,359	49.8
Expenses.....	84,080	49,786	Inc. 34,824	69.9
Net earnings.....	\$68,004	\$52,439	Inc. \$15,535	29.6
Per cent. of expenses. 55.43	48.60	Inc. 6.83	14.1	
Houston & Texas Central.....	401,592	.....	.....	.....
Toronto, Grey & Bruce.....	34,925	35,044	Dec. 119	0.3

	1876.	1875.	
Chicago Milwaukee & St. Paul.....	\$527,000	\$466,000	Inc. \$61,000
Illinois Central.....	588,447	597,322	Dec. 8,775
Missouri, Kansas & Texas.....	266,450	98,100	Inc. \$58,859
Ohio Mississippi.....	315,795	251,396	Inc. 64,399
St. Louis, Kansas City & Northern.....	246,595	208,086	Inc. 38,447
Toledo, Peoria & Waukesaw.....	133,558	71,437	Inc. 62,121

Great Western.....	215,144	\$13
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New Brunswick Fish Traffic.

A considerable traffic is springing up in fish from the New Brunswick rivers which is sent to Eastern cities for sale. A number of refrigerator cars are being built in which salmon from the Miramichi and the Restigouche can be sent over the Intercolonial to St. John and thence to Boston and New York. The present price of salmon is so high that it can well bear the cost of transportation as fast freight in this way. Indeed, a considerable quantity is carried from the Pacific coast to the East.

Flour and Grain Movement.

The Portland (Oregon) *Commercial Reporter* gives the total exports of wheat from Oregon for the year ending Dec. 31, 1875, at 2,238,137 bushels. All of this went through the Columbia River ports.

Receipts and shipments, flour in barrels and grain in bushels, are reported as follows for the period Jan. 1 to Jan. 29:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts.....	427,958	386,678	Inc. 41,280	10.7
" " shipments.....	460,053	362,485	Inc. 97,568	27.0
Atlantic ports' receipts.....	873,489	736,744	Inc. 136,745	18.4

Wheat:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts.....	3,063,278	3,063,833	Dec. 930,655	23.4
" " shipments.....	1,075,091	927,682	Inc. 147,409	15.9

	1876.	1875.	Inc. or Dec.	P. c.
Atlantic ports' receipts.....	1,501,239	1,288,212	Inc. 213,027	16.4

Corn:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts.....	4,216,902	4,595,300	Dec. 378,336	8.2
" " shipments.....	2,903,354	1,772,277	Inc. 1,130,077	64.0

	1876.	1875.	Inc. or Dec.	P. c.
Atlantic ports' receipts.....	5,865,898	5,110,001	Inc. 755,897	14.8

Grain of all Kinds:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts.....	0,075,155	10,729,470	Dec. 1,653,118	18.4
" " shipments.....	4,926,275	3,732,859	Inc. 1,195,416	32.0

	1876.	1875.	Inc. or Dec.	P. c.
Atlantic ports' receipts.....	9,134,219	7,826,599	Inc. 1,307,620	16.7

Some of the changes since last year are great, as is not unusual. The business at northwestern ports has been about a third larger in shipments and nearly a tenth smaller in receipts of grain than last year; but both receipts and shipments were much larger in 1874, when they were the greatest ever known. This winter's movement of grain to the sea-board, however, has been exceeded only in 1874, when the foreign demand was great.

Iron Movement.

The Pittsburgh *Manufacturer* gives the receipts of iron at Pittsburgh for the past year as follows:

	Muck-bar, blooms and scrap	Ore, tons.	Div.	Length . . .	Average weight of ingots, lbs.	Days' work . . .	Cost . . .	Average cost per section.	Average cost per month.	Average cost per mile . . .	Average cost per month . . .	Wear . . .
Pitts., Ft. Wayne & Chicago.....	78,410	33,890	1	117 M.	4.9 M.	26,619 1/2	\$40,991	20	1,701 97	142 33	360 35	20 20
Pennsylvania R. R.	14,686	11	116 "	5.3 "	20,822	32,261	62	1,466 44	122 20	278 12	18 18	
Allegheny Valley.....	18,540	5,570	3	122 "	5.6 "	19,981 1/2	30,894	78	1,403 85	116 99	253 15	21 10
Cleveland & Pittsburgh.....	18,670	101,080	Total	355 M.	5.25 M.	67,423 1/2	104,137	60	1,581 43	127 62	293 35	24 45
Pitts., Cinc. & St. Louis.....	480	.....									
West Pennsylvania.....	12,560	.....	Tot'l for 1874	79,318	127,413 46	1,873 73	156 06	358 01	29 91			
Pitts. & Connellsville.....	15,150	2,400										
River.....	19,356	5,097										
Totals, 1875.....	177,842	168,596										
Totals, 1874.....	259,611	265,317										

A decrease of 81,769 tons, or 31.5 per cent., in scrap, of 86,721 tons, or 34 per cent., in ore, and an increase of 39,986 tons, or 19.4 per cent. in the other items. Much of the decrease was caused by the three months' strike of the puddlers in 1875, which also caused nearly the increase in receipts of muck-bar, etc.

Coal Movement.

Coal receipts at Pittsburgh for the year ending Dec. 31 are reported by the *American Manufacturer* as follows:

	1876.	1874.	Inc. or Dec.	P. c.
By rail, tons.....	1,569,711	1,824,847	Dec. 265,136	14.5
By river, tons.....	2,046,967	2,196,153	Dec. 149,186	6.8
Total.....	3,605,678	4,021,000	Dec. 414,322	10.3

Coke:

	1876.	1874.	Inc. or Dec.	P. c.
By rail, tons.....	1,017,963	1,169,631	Dec. 171,776	14.4
By river, tons.....	38,308	32,375	Inc. 5,933	18.3

	1876.	1874.	Inc. or Dec.	P. c.
Total.....	1,056,211	1,222,056	Dec. 165,845	13.6

	1876.	1874.	Inc. or Dec.	P. c.
Total coal and coke.....	4,662,889	5,243,056	Dec. 580,167	11.1

The coal production of the Nova Scotia mines for the year ending Dec. 31 was as follows:

	1876.	1874.	Inc. or Dec.	P. c.
Shipped to :.....				
Maritime Provinces and Newfoundland.....	404,687	391,450	Inc. 13,137	3.3
Quebec.....	189,754	162,260	Inc. 27,494	16.9
United States.....	89,746	138,335	Dec. 48,889	35.1
West Indies and South America.....	21,208	52,921	Dec. 31,713	59.9
Other Countries.....	1,500	4,161	Dec. 2,661	63.4
Total.....	796,795	749,127	Dec. 42,322	5.7

The local trade shows a steady increase. An attempt is to be made this year to open a trade with the Province of Ontario.

The lines leading directly from the anthracite region report tonnages as follows for the month ending Jan. 29:

	1876.	1875.	Inc. or Dec.	P. c.
Del., Lackawanna & Western.....	167,030	177,614	Dec. 10,434	5.9
Delaware & Hudson Canal Co.	186,908	191,507	Dec. 14,599	7.6
Pennsylvania Coal Co.	103,462	92,953	Inc. 10,500	11.3
Pennsylvania & New York....	2,978	1,482	Inc. 1,496	100.9
Lehigh Valley.....	230,817	302,633	Dec. 71,813	21.7
Lehigh Division, Central of N. J.	196,544	78,460	Inc. 118,084	150.5
Dan., Hazleton & Wilkesbarre.....	1,774	7,471	Dec. 5,697	76.3
Philadelphia & Reading.....	143,974	149,286	Dec. 1,512	3.6
Shamokin and Sunbury Branch.....	14,612	35,150	Dec. 20,538	58.4
Sullivan & State Line.....	4,282	2,481	Dec. 1,801	57.0
Totals.....	1,042,431	1,038,937	Inc. 3,494	0.3

Bituminous and semi-bituminous tonnages are reported as follows for the same period:

	1876.	1875.	Inc. or Dec.	P. c.
Cumberland, all lines.....	77,764	78,196	Dec. 432	0.6
Huntingdon & Broad Top.....	10,185	71,292	Dec. 23,176	32.5
Tyrone & Clearfield.....	48,116	71,292	Dec. 23,176	32.5
Barclay R. B., bituminous.....	50,966	3,112	610	19.7
Total.....	187,031	.....	.....	.....

The tonnage of the Belvidere Division, Pennsylvania Railroad, for the month is reported as follows:

	1876.	1875.	Increase.	P. c.
Coal Port for shipment.....	2,523	2,528
South Amboy for shipment.....	68,715	13,167	55,548	421.9



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Editorial Announcements.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed Editors RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE MASTER MECHANICS' ASSOCIATION.

The annual meeting and reports of this Society have now been known so long to railroad men in this country that little need be said of the objects for which the Association was organized or of the methods which it has adopted and the work which it has accomplished. Its annual conventions have, by many of its members, been anticipated with pleasure each year, and have usually been occasions of both enjoyment and profit. There can, however, be no doubt that to many these events have lost the charm of novelty. Members have become familiar with the way in which the reports of committees are prepared, and the discussions, although differing on the subjects discussed, have no striking novelty, and begin to have the effect upon the audiences of new plays by old actors. Whether such plays are interesting or not depends entirely upon the skill and resources of the actors. If the annual proceedings of an association like that of the master mechanics should grow monotonous by reason of running in the same groove, even though new information should be evolved, members will be sure to lose interest in them, and then attention and attendance will begin to flag. Few men will stand an unlimited amount of statistics year after year regarding the amount of wear per sixteenth of an inch of thickness of steel tires, and very properly so. A very entertaining and to some extent instructive essay has been written on the "Capacity of the Human Mind to Resist Knowledge." All of us—at least those who are at all busy—are obliged to exercise their capacity for self-protection. There is an amount of detail in knowledge which soon becomes a burden instead of a help, and we are all obliged to condense that knowledge into a general law or principle in order to make it at all serviceable. If the reports of the committee appointed each year assume the form of a mere collection of dry, undigested details, such as the data referred to concerning tires or the number of thirty-seconds of an inch of lap and lead of slide valves, the members will soon begin to refuse to listen, and as feathered creatures in a rain storm resist each drop which falls and refuse to absorb any of the moisture, so the attendants at the meetings referred to will decline to receive what would only be an incumbrance to them.

To maintain the interest of these meetings, it will be

necessary that those who attend them should each year go away feeling that they have gained enough information to repay them for the time and money expended in order to be present. Whether this will be the case or not, will depend very largely on the committees who prepare the reports, but also quite as much on the members who furnish materials for them.

It may not be amiss here to call attention to what seems to be a misconception on the part of some of the members in writing their reports. They seem to have the opinion that what is required of them is to prepare a series of questions, which are sent to members, and that all the work which the committee can be expected to do thereafter is to report the replies received in answer to those inquiries. Now in most cases a report on any subject should involve much more than this. It usually refers to some subject which is imperfectly understood, and, to use a term which has of late come into fashion, they should "formulate" the subject; that is, discover, if possible, the theory or principles which underlie it. To do this it is necessary to study most subjects synthetically as well as analytically; or, in other words, from well-established principles applied to the subject under consideration draw conclusions, and from empirical knowledge trace out original principles or causes. It is only the empirical knowledge which a committee should expect to receive from members of the Association in reply to circulars. The deductions to be made therefrom must be the result of the study of the subject by the committee. It is of course true that often the principal part of the knowledge must be simply the results of experience, as in the case of the mileage of car wheels; but even from these it is difficult to draw conclusions of any value unless the facts are collected in some systematic manner; and if not afterwards digested they assume the character of a mass of disconnected data, which neither prove nor teach anything.

At the present time there seems to be a general indifference and lack of interest in the proceedings and welfare of the Association. The novelty of its proceedings, as has been stated, has worn out. There is, as nearly always happens, some dissatisfaction. There are numbers of do-nothing members who are perpetually finding fault and never lifting a hand to make things better; there are scornful members, too, who treat all that others do contemptuously and never expose their own profound wisdom to criticism or put it to any practical use. Then there are men who always want the Association to do something, as though knowledge was like a locomotive, and our ignorance due to its being off the track, and all that was needed to make us wise was to "jack up" the old machine and by a liberal amount of shouting, and some swearing, get it back again, and thus all would be made wise. Alas, for such people! science and knowledge require gentler wooing. Neither brute force nor a majority vote will elucidate scientific principle, whereas a patient student will often make discoveries in solitude which in their application will produce results whose importance cannot be measured by "horse-power." We have repeatedly heard members of the Master Mechanics' Association ask why they did not determine something, as though the causes of steam boiler explosions would be decided by the vote of the members.

The fact is, the future of this Association will depend upon the work which its members are willing to do for it; and the time has come, as it always does in such organizations, when it must depend upon this resource alone. It has safely, we think, steered clear of some of the dangers which at one time threatened to destroy it, and if report speaks truly, the Committee of Arrangements, into whose hands the material comfort of the members has to a certain extent been intrusted during next year's meeting, will entirely eliminate what many members have heretofore objected to. It must be kept in mind, however, that as the meeting will be held in Philadelphia, the attractions of the Centennial Exposition will detract very materially from the interest in the meetings of the Association. Less time will probably be given this year to the discussions than heretofore. The business will be crowded into a smaller compass, and the inevitable tendency will be to hurry through with whatever comes up. There is, therefore, more reason than ever before to condense the reports into as small dimensions as possible; and, as we have taken occasion to recommend heretofore, all tables of statistics or elaborate figures should be put into the form of appendices, to be printed with the reports but not read unless when absolutely necessary. Thus a great deal of time and attention could be spared, and instead of being wearied before the discussion begins, members would have some potential intellectual energy left, when they came to talk about what others had reported on.

There are, too, managers who still refuse to give encouragement to the Association, on the ground that it is not sufficiently useful to justify their support. Most of those who hold such views seldom or never attend the meetings, and whether they read the reports of proceedings is doubtful. We believe, however, that few railroad managers could read any of the late annual reports care-

fully without learning some things which would be of very decided value to them and to the companies whose affairs they administer. It should be remembered, too, that during the sessions of such meetings, not only are the subjects discussed publicly, but that a vastly greater amount of discussion is carried on after adjournment and before being called to order. These discussions are unrecorded and unpublished, and the only way in which the X. & Y. Railroad Company can be benefited thereby is by sending its Master Mechanic and letting him collect as he can of the crumbs which fall so liberally from the table which the Association spreads annually. It is remarkable how very slight an estimate most railroad managers and directors place on the value of mechanical and scientific knowledge in those whom they entrust with the management of their very expensive property. Often the want of some apparently slight information concerning a grim subject will cost thousands, and hundreds of dollars can be wasted monthly simply because master mechanic does not know accurately where the money goes to or for what it is expended. Such things are demonstrable, as was shown recently by the results of keeping accurate accounts of the service performed by car wheels; and we can imagine how an unscrupulous manufacturer of car wheels would wink his "off eye" and insert his tongue surreptitiously in his cheek when closing a bargain with a railroad company which keeps no such accounts, to furnish it with wheels which would run 99,999 miles before wearing out. It is at any rate a fact that wheel-makers are now furnishing wheels which run farther and not guaranteeing them to run so many miles as they did a few years ago. Now there are many other directions in which ignorance is just as expensive as it is about the service performed by car-wheels. What railroad company, for example, knows accurately the value of the coal burned, measured by its steam-generating capacity? It is almost certain that ignorance in that direction is as costly as it is about wheel service. For these reasons, then, we believe it to be unwise and false economy for a railroad manager to discourage his master mechanic from attending these annual meetings, which are especially intended for the benefit of those engaged in the same calling as himself.

In writing as we have, it is with no impression that the usefulness of this Association is on the wane. On the contrary, it grows into better working condition each year. What we do want to impress on members, however, is that if they want the organization which is representative of the occupation in which they are engaged to fulfill the purpose which it should, each of them must do his share of work; and that the contribution which each one makes will be one of the units on which the prosperity of the Association must rest. If the circulars are unanswered, see that they are not neglected; and if there is a report which is still unwritten, lose no time in trying to learn something about the subject, so as to be able to make a creditable report.

JANUARY TRAFFIC.

The traffic of the new year, so far as it is reported, seems generally to be favorable. During January, the grain movement from the Northwest to the seaboard was very large, and has been exceeded only in one previous year. The shipments of Northwestern primary receiving cities have been larger by 32 per cent. than in 1875, and as rates have been remunerative, this large business, all moving by rail, must have been a considerable source of profit to the trunk lines. The receipts at Atlantic ports were a sixth larger than last year, indicating that the largest part of the increase is intended for export. The receipts at the Northeastern cities, however, were less by about 15½ per cent., which is accounted for by the fact that the stocks on hand in store there are unusually large. There is a large amount of grain, especially corn, in the Northwest, and apparently the railroads will be able to carry a considerable proportion of it to the East before the opening of navigation. They are carrying more than last Winter, the rates are better, and their working expenses are less, owing to the much milder Winter.

Another great staple traffic, though it is not shared by so many roads, is petroleum. This is in an exceptionally good condition; prices are high and production and movement enormous. The exports alone during January were 24,000,000 gallons, and 65 per cent. more than for the same period in 1875, and a third more than for the same month in any previous year. This is usually a profitable traffic, especially when good prices are obtained for the oil, as now.

The currying of hogs and hog products is one of the most important branches of traffic in the Winter on many northwestern railroads. For the crop year beginning with November, the number of animals packed so far has been about 10 per cent. less than last year, though this is about balanced by the increase in the average weight; but for the month of January the number of hogs packed was about 15 per cent. greater this year than last.

Anthracite coal is not only an important traffic in itself to many Eastern railroads, but its consumption is to some extent a key to the activity prevailing in many im-

portant industries. The production last January is reported as almost exactly the same as in January, 1875. This production is light, however. Last year a large proportion of the collieries were closed on account of a miners' strike; and this year all the great carriers have immense stocks on hand, which go off slowly, and enable them to supply almost any demand without producing—what they have recently ceased doing.

The great staple of the South is not a very bulky one, but almost every bale of cotton is carried a great distance, the manufactories being for the most part either north of the Potomac or in Europe. Last year's crop was an exceptionally large one, and from Sept. 1, when the crop year begins, to the end of January 16 per cent. more had been delivered to sea ports than for the corresponding period last year. But the January traffic has shown a much greater increase; it was not less than 38 per cent. Cotton, too, is no longer, we believe, carried at the very low rates prevailing a year ago, so that the Southern railroads probably have received an increase in profit on this traffic (if, indeed, there was any profit on it last year) much greater than the increase in the amount of business.

Thus the year seems to open favorably so far as these great traffic staples are concerned. There is more business and the prices are better. It is true, nevertheless, that many manufacturing industries are still languishing, and that the important traffic afforded by these, of which no records are preserved, is generally very unsatisfactory, though it may be so and still be better than it was last year. It is the traffic in raw materials which is best reported, and this seems really very good, with the exception of anthracite coal, the production of which has been generally suspended since the month of January.

Railroad Accidents.

We hope our readers have not failed to read the interesting and suggestive papers on railroad accidents which Mr. Charles Francis Adams, Jr., has been contributing to the *Atlantic Monthly*, beginning with the November number, to which we should have called attention before. Of four papers that have appeared so far, all but the last have been chiefly devoted to the history of the most prominent accidents, beginning with the killing of Mr. Huskisson on the very day of the opening of the Liverpool & Manchester Railway, in 1830, and closing in the January number with a sketch of the horrible Revere collision in 1871; with comments as to the effect of these accidents on railroad management and improvement. "Few lives," says Mr. Adams, "are so profitably expended as those of the unfortunate victims of railroad accidents," explaining that every great accident directs the attention of the community to some defect in the machinery or system of management to which that and similar accidents are due, and compels those in charge to exercise all the care and skill of which they are capable to avoid that whole class of accidents in the future. Perhaps this statement should be limited to the victims of great railroad accidents, in which numbers are killed and injured at once. As Mr. Adams shows in his paper entitled the "Railroad Death Rate" in the February *Atlantic*, the whole number of passengers killed in railroad accidents is trifling compared to the victims of dozens of other accidents which are hardly thought worth mentioning. One passenger lost his life in a railroad accident in all Massachusetts one year, while within the same period in Boston alone fifteen persons were killed by falling down stairs, twelve by falling out of windows, fourteen were burned to death, seventeen were killed by being run over in the streets, ten lost their lives in "coasting," and eight were the victims of homicide. Thus it appears that railroads are hardly worth considering as a cause of death to travelers, and yet there is a great deal of talk about the danger of the rail, and often a great deal of indignation and anger.

The reason of this is, doubtless, that, in the first place, railroad accidents often kill by wholesale, and, further, with the most fearful mangling, scalding or burning. We hear that a man was thrown from his carriage and killed, feel a pang of pity, and think no more of it. But a Revere collision is almost like a battle, only more cruel. Eighty-six persons crushed, burned and scalded—eighty-six gray-haired men, little children, tender women, unoffending travelers on business or pleasure. We do not hear of such a slaughter with indifference. It is a tragedy which makes a lasting impression on the senses infinitely greater than eighty-six separate and distinct cases of falling down stairs, breaking through thin ice, or slipping under loaded wagons. The whole country stands aghast, and the event is remembered with horror for a generation.

That the dangers of railroad traveling are magnified in popular opinion by the wholesale manner in which people are slaughtered by great accidents becomes plain when we consider that very little is said or thought of the dangers to persons walking on railroad tracks, while in fact several times as many are killed in this way as by accidents to the trains. But they are killed one by one, and hardly any mention is made of the casualty except near the place where it happened. Almost every person in this country and Canada, and millions in Europe, heard of and were shocked by the Revere collision; but on that very day a hundred persons might easily have been run over and killed, no two of them in the same town, without attracting any general attention.

It is, then, the great railroad slaughters which result in the salvation of future travelers. A dozen collisions or derailments due to a single cause, hurting no one or but one or two at a time, may not cause the adoption of a reform by which such accidents will be avoided; while a single accident, killing ten or twelve persons, will. It is after such a catastrophe that the community first become aroused and that railroad man-

agers finally decide that they can no longer do without a new siding here or a second track there, or power brakes on their trains, or Miller platforms on their passenger cars, or an improved signal system. The weak spots may have been shown often before; but the sacrifice of a number of lives and limbs sets the weakness in a light so strong that it can no longer be ignored or neglected. The crash arouses the most easy-going officials, and until they attempt a remedy for the fault they see on all sides the community persistently pointing to the fault that needs remedying.

One reason, and a very good reason, why railroad accidents excite attention and indignation out of proportion to the frequency of fatalities caused by them, is the fact that a large proportion of those which occur are preventable, or seem so. We accept a certain number of deaths by drowning, burning, and the like, as inevitable. Experience during all time has taught us that they will occur, and that no means have ever been contrived to prevent them. But the running of railroad trains is a new art. We have by no means exhausted the methods of securing safety, and even where no approved remedy for an evil exists, we feel that very probably one may exist, and that it is the duty of those engaged in the business to strive diligently to find it. Besides, as we have said, a large proportion of the accidents occurring are evidently preventable. They are chargeable to the disobedience or neglect of some man, or to some manifest imperfection in machinery or appliances. Now, while it is probably impossible to adopt a system which will insure accurate and skillful service from any class of men under all circumstances, or the maintenance of roads and rolling stock even in the condition which the managers exact, yet it is reasonable and most desirable that every failure in these points should be visited with sharp public disapprobation and severe penalties. Then only can we be sure that generally an earnest effort will be made to secure the maximum of safety. We do not expect to put an end to murder by the infliction of the penalties of the law, but we hope thus to make this crime less common than it would be otherwise.

In the article on the "Railroad Death Rate," Mr. Adams makes some statements from statistics which are very striking, some of which we will repeat in somewhat different form.

From 1861 to 1874, inclusive, in the State of Massachusetts:

1 passenger was killed to 8,900,000 carried.
1 passenger was injured to 1,400,000 carried.
1 passenger was killed to 115,000 miles traveled.
1 passenger was injured to 18,000,000 miles traveled.

Since the Revere accident, from which dated the general use of the Westinghouse or other train brake and the Miller platform on Massachusetts railroads, and the more general use of the telegraph in running trains, the figures have been (for four years):

1 passenger killed to 130,000,000 carried.
1 passenger killed to 1,700,000,000 miles traveled.
1 passenger injured to 3,100,000 carried.
1 passenger injured to 40,000,000 miles traveled.

The accidents to passengers, however, are but a fraction of the whole number. The chief victims of railroad trains are trespassers on the track and railroad employees. Thus in the four years named in Massachusetts the killed and injured were reported as follows:

	Killed.	Injured.	Total.
Passengers.....	1	41	42
Employees.....	192	220	412
Others.....	407	259	666
<hr/>	<hr/>	<hr/>	<hr/>
Total.....	600	520	1,120

Mr. Adams makes some comparisons of the Massachusetts accidents with those of Great Britain; but in reality the British reports of traffic are not complete enough to afford an accurate basis for a comparison. These reports give the number of passenger journeys, but not the number of miles traveled, and it is unsafe to assume that a passenger journey is the same thing—that is of the same length on the average—in Great Britain and Massachusetts. But with this assumption, neglecting commutation passengers, the number of passenger journeys to each passenger killed or injured was for the sixteen years ending with 1875 for Massachusetts, and the four years ending with 1874 for Great Britain:

	In Great Britain	In Massachusetts
Passenger journeys to one killed.....	10,700,000	6,600,000
" " " injured.....	333,000	900,000

This period for Massachusetts includes the Revere accident, of course, and three-fourths of the deaths for the entire sixteen years are due to that. Thus the risks of injury have been much less on the Massachusetts roads, the risk of death greater. But when we take the injuries to others than passengers, there is a striking difference. Mr. Adams assumes that the Massachusetts report must be imperfect so far as injuries not resulting in death are concerned, and makes his comparison with the deaths alone. From what we have seen in the English papers, we think it quite probable that the British reports are very incomplete with regard to accidents not occurring to passengers. But the deaths actually reported are nearly $2\frac{1}{2}$ on the Massachusetts railroads to one on the British for the same amount of traffic. This evidently is due to the greater prevalence of trespassing on tracks in this country and to the general admission of grade crossings here, even in large towns and cities.

Mr. Adams also makes a comparison of the accidents reported in the *Railroad Gazette's* record with those of Great Britain. In this he says that far more trains were run and more passengers carried on the 17,000 miles of British railroads than on the 72,000 miles in this country. We doubt, however, whether there has been so much more traveling there than here. The population of this country is one-third greater than that of Great Britain, and while there are probably more journeys there, on the average they are shorter ones. We cannot prove this, for the British statistics give no information whatever as to passenger mileage. But the passenger receipts in this country for the last year reported were a little greater than those of the British roads, and the average rates here are certainly not very much higher—first-class rates being much lower. Passenger trains are much more numerous there than here,

for the same amount of traffic, and the average train-load is probably less, though the same lack of statistics prevents a confident statement of this.

But if there are no more than 240,000,000 passenger journeys here to 480,000,000 in England, as Mr. Adams supposes (and as is probable), our statistics would indicate that for the same number of journeys there are in this country one-half more train accidents, four times as many deaths, and an equal number of cases of injury.

The most striking difference is in the nature of the accidents. Our reports for two years show that about 25 per cent. of our train accidents were collisions; 75 per cent. were collisions in Great Britain. Here 60 per cent. were derailments; there less than 10 per cent. The causes are evident. There the railroads are nearly perfect in condition of track; here, on the average exceedingly imperfect. Here most of the roads are very far from crowded; there a large proportion of the lines are crowded with trains to an extent known here only on three or four of our busiest roads.

There is indeed a radical difference between European and American railroads. It was indispensable that the latter should be cheap. In fact, with labor and all materials higher than in any European—higher than in almost any other civilized country, our railroads have not cost half as much per mile as the European roads. The economy has been in the construction of the roads. They have more and shorter curves, often unballasted and generally poorly ballasted road-beds, and usually much lighter rails, bridges and similar structures, frequently no fences, and generally they cross highways and city streets at grade. All these imperfections make it easier for trains to leave the track, except that perhaps the lightness of the rails is compensated by more frequent ties. We might almost say that European rolling stock could not run at all on some American roads that we count pretty good. American ingenuity has been largely devoted to the contrivance of rolling stock which will run on imperfect tracks and of apparatus to mitigate the effect of accidents. Our cars are made flexible by trucks, which adjust themselves readily to inequalities of track and sharp curves, our unequalled brakes and the rigid Miller platforms lessen the effect of the too numerous accidents, and the strength of the car-bodies is made such that they often pass whole through shocks which would crush English "carriages" like egg-shells. Put European rolling stock on American railroads and our "railroad death rate" would doubtless become something fearful; accidents, now common and expected to be common, would become more frequent and very much more deadly. In Europe too little attention has been paid to these things, but the roads have been made so perfect in line and surface and with curves so light that cars seldom leave the rails, while the roads are so fenced in, watched and guarded that it is almost impossible for any stray animal, vehicle or man even to get in the way of a passing train. Our accidents are largely the result of the indispensable cheapness of our average roads, and the economy of labor with which they must be worked. We have this in our favor, that if we some time have the means and the disposition to make our roads thoroughly good, like the European roads (as a few now are, so far as tracks are concerned), provide crossings above or below the tracks, and keep the force needed for a complete signal system, our safety apparatus, developed to meet circumstances which made frequent accidents inevitable, ought to give us an advantage over the railroad systems of all other countries. The improved roads should make accidents as rare as in Europe; the existing safety apparatus should make their effects much less serious.

The Texas & Pacific Guarantee.

The Texas & Pacific Company has had its proposition for a guarantee of its bonds before the Pacific railroad committees of Congress for some time recently, where it has been argued by Mr. Scott and others on its part, and by Mr. Huntington on the part of the Southern Pacific Company in opposition, and a great deal of pressure has been exercised by various interested parties. It is now reported that the House sub-committee (appointed specially to consider the bill) has decided to report favorably to the House Committee, and that without much doubt the latter will report favorably to the House. As to the disposition of the House itself, little seems to be known as yet; but it is probable that the promoters of the measure see at least a fair prospect of success before them, else they would hardly make so great an effort. It is reported that at one of the hearings of the parties before the sub-committee Mr. Scott said that if the Southern Pacific would agree that Congress might control the rates on its road, the Texas & Pacific would use it and would not construct a parallel road through Southern California. Mr. Huntington is reported to have responded for the Southern Pacific that his company would consent to this control as far east as the Rio Grande even, if authorized to construct the line from the West until it should meet the Texas & Pacific coming from the East. As the line from some 150 miles west of the Colorado is perhaps the most desolate desert on earth, it certainly would be a great waste to build two railroads there, and it ought to be possible to make such arrangements that both roads, if there are to be two roads, will use the same track for at least this part of the line. The only traffic of any importance from the present terminus of the Southern Pacific to the Rio Grande itself—and beyond a good distance into Texas, for that matter—is the Arizona mining traffic and a little mixed traffic in New Mexico. The Arizona traffic may perhaps become important, something like that of Nevada; not very great in amount, but of a kind that can afford to and can be made to pay profitable rates. If the Southern Pacific reached it from the West and the Texas & Pacific from the East, they would probably compete to some extent in carrying supplies for the country, much as the Central Pacific and the Union Pacific now compete for the Utah trade; only in the case of Arizona, California and the Western road

would have the advantage in distance. The control of other rates by Congress is a much more hazardous matter for the Southern Pacific than for the Texas & Pacific. If the latter's rates should be reduced so as to have no, or an insufficient, profit, then the Government would have to pay the guaranteed interest. The Southern Pacific having no guarantee from the Government, the latter would have no direct interest in maintaining or permitting remunerative rates.

It is remarkable how many interests are involved in this matter to some extent. The Southern Pacific people do not on their own account appear to object to a subsidy to the Texas & Pacific, except so far as it will be used to destroy or lessen the value of the road which they have built and are building without a subsidy; but a large number of other railroad companies regard the matter with greater or less favor according as they expect their traffic to be affected by the proposed new line. The Southern railroads are supposed generally to favor any action that will ensure the completion of the main line to the Pacific; but naturally existing roads from various Mississippi River points to Texas object to the subsidizing of new lines which will not only lessen the share of traffic that they might receive from the Texas & Pacific road, but also divide a large part of their other business. If government aid should extend the Atlantic & Pacific road to a junction with the Texas & Pacific, it would surely deprive the Missouri, Kansas & Texas and the St. Louis, Iron Mountain & Southern of a part of the traffic that they might otherwise receive. So a new line from Jefferson or Texarkana to Memphis would carry a traffic nearly all of which would otherwise go to the St. Louis, Iron Mountain & Southern and the Memphis & Little Rock roads, and these latter, which are eager enough to have the Texas & Pacific completed and contribute to their traffic, feel somewhat indignant that the Government should create competitors for their business while they are still unable to earn anything like a reasonable interest on their capital. So the Texas roads leading to Galveston, and forming good Gulf outlets already made at private cost for Texas & Pacific traffic will feel that the national resources are expended for the injury of their property if a New Orleans or other new Gulf connection should be built by means of a subsidy. When we come east of the Mississippi, there is less division of interests among the Southern railroads. Those in Virginia even may hope to have some contribution to their traffic from a Southern Pacific railroad, by whomsoever built; for a very large part of its through traffic will inevitably be shipped from or consigned to points north of the Potomac. They should remember, however, that to share in this traffic they must compete directly with the Northern railroads from the East to Omaha, which for the most part can afford to and do carry freight and passengers for less than the bare cost of transportation on most Southern railroads.

We publish this week on another page a letter from the Secretary of the Southern Pacific Company in reply to the one from the Vice-President of the Texas & Pacific published a few weeks ago, which discusses another phase of the question, as it appears to his company.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Delaware & Bound Brook.—Track laid from Bound Brook, N. J., southwest to Hopewell, 16 miles.

Havana, Rantoul & Eastern.—Extended from Rantoul, Ill., west, 10 miles. It is of 3-foot gauge.

This is a total of 26 miles of new railroad.

The extension of the Peach Bottom Railroad, noted last week (4 miles), was made in 1876.

The total certainly laid in 1876, so far reported, is 70 miles; besides there are 12 miles of the Scioto Valley and 4 miles of the Nevada County of which we have no positive information.

THE METROPOLITAN RAILWAY (one of the London underground lines), according to its report for the last half of 1875, recently published, had a much larger traffic last year than ever before. The figures are:

	1875.	1874.
Number passengers carried	48,502,924	44,118,225
Gross receipts	\$448,364	\$441,550

The traffic was a trifle larger in 1872 than in 1874, but with that exception the traffic of 1874 has never been exceeded until last year, when the increase over 1874 was about 9% per cent. If all the receipts had been from passengers (a very small proportion is from other sources, but the report does not say how much), the average receipt per passenger would have been 2.23 pence—about 4½ cents gold. A very large proportion of the travel goes but very short distances over the road, which is eight miles long. The working expenses for the last half-year were 88.2 per cent. of the receipts. The company pays a 4 per cent. dividend for the last half-year—the largest for many years, and doubtless the largest it ever earned. In earlier years larger dividends were paid, but it was afterward found that they were paid out of capital.

MR. RICHARD BANNER OAKLEY, the manager and proprietor of the Co-operative Credit Bank, which undertook the negotiation of the Keokuk & Kansas City Railroad, was brought before the Lord Mayor of London, Jan. 21, charged with obtaining money on false pretenses and conspiracy with other persons for that purpose. It was shown that the bank was established in the middle of 1874, had received from the public about £40,000 since that time, and when an execution was put in, Jan. 15, there was only 11s. 1d. in the bank. The prisoner was committed and bail refused. At the time of the advertising of the bonds, when the *London Times* attacked both bank and bonds, we said that though the bonds appeared to be no better if no worse than most of the new American railroad bonds previously negotiated in London, the bank seemed deserving of all the discredit it was likely to get.

THE WATKIN ERIC COMMITTEE, according to a London paper, had at the beginning of February secured the assets of only one-twelfth of the bond and shareholder to its scheme of reorganization, and it says that Messrs. Miller and Fleming, the representatives of the Dundee bondholders, who were to sail for New York on the 29th, come to arrange "the other scheme." What "the other scheme" may be the telegram does not say, but judging from the position of the gentlemen as representatives of the first-mortgage bondholders, we may presume that it is the foreclosure of the first mortgage, and if the shareholders and holders of lower classes of bonds will not be induced to make any sacrifices to secure their interests, we hope that Messrs. Miller and Fleming may succeed in foreclosing with neatness and dispatch.

NEW PUBLICATIONS.

American Architect and Building News.—Messrs. J. R. Osgood & Co. began with this year the publication of a weekly architectural journal, which had been adopted beforehand by the American Institute of Architects as its official organ. The paper is modeled on the leading English architectural papers, *The Builder* and *The Building News*, in form and general appearance. Each number has eight pages of text and four full-page engravings produced by the heliotype process, of which the publishers are the proprietors in this country—the process by which our engraving of the Boston & Providence station was produced, and apparently especially suited to architectural drawings. The paper is edited by Mr. W. P. P. Longfellow.

There has long been a lack of such a journal in this country, and the *American Architect* from the five numbers that have appeared in January seems likely to fill it satisfactorily. There are enough architects of taste, skill and culture to supply the necessary material for it, and certainly enough who need the information it can impart to support it well. We commend it to the attention of that large class of railroad engineers who are often compelled, willing or unwilling, to be architects also, and to design structures of first-rate importance, as well as those numerous slighter buildings in which good design is quite as desirable, and is generally lacking.

Designing Belt Gearing. By E. J. Cowling Welch. E. & F. N. Spon, London, and No. 446 Broome street, New York.

This is a little pamphlet of 16 pages, and is a brief summary of the rules for designing belts. It is to be regretted, however, that the author should have obscured the injunction which his little treatise contains by such a display of mathematical gymnastics. Doubtless his algebra and trigonometry enable him to express what he intended to more concisely to those familiar with these branches of mathematics; but in writing such matter it should be remembered that the great majority of those for whom such a book is intended are ignorant of all mathematics excepting the simple rules of arithmetic. It is therefore very much like writing a treatise in French for those who know no other language than English, because French has greater clearness of expression. It does not matter whether algebra and trigonometry are capable of expressing what is meant to be conveyed more clearly than arithmetic, if those for whom the book is intended do not know anything about algebra and trigonometry. For them, arithmetical calculations are the best and most clear.

Military Map of the Indian Territory.—By Lieut. E. H. Buffner, Corps of Engineers, Chief Engineer Department of Missouri. Published by the War Department.

Naturally a large portion of our geographical information concerning the newer parts of our country was first gathered by army officers. The army has usually been the first explorer, and for it, geography and topography were of the first importance. Moreover, the army has been fortunate in having a body of skilled topographers. Probably in early days our army engineers had a larger proportion of topographical work than now, when there is much more construction entrusted to them. At least, we had then a separate Corps of Topographical Engineers, whose labors recorded many early explorations on which our maps are based.

There has been a tendency, perhaps, to record only the first explorations; and as soon as the general features of the country became known, less care was taken to have the route mapped when chance expeditions were made. Of late years most valuable work is being done by the exploring expeditions; and, moreover, in some districts at least, the officers have tried, whenever possible, to have a topographer accompany every march and map the route. In this way, in course of time (and in no very long time with our active army on the frontier), a mass of material is collected, of the utmost value for campaigning purposes, especially in the barren districts where Indian campaigns are chiefly made, where a mistake in a route might sometimes cause the loss of a detachment and often occasion the failure of the expedition. But it is also of great value for general geographical purposes.

Lieutenant Buffner's map of the Indian Territory, while utilizing the information contained in maps hitherto published, has benefited very largely by these campaign maps, and other more formal surveys executed by the army of late years. It has astronomical positions fixed by observation at four points (two for latitude only), and military surveys and reconnaissances of eighteen different routes are enumerated among the sources of information, besides the surveys of the Atlantic & Pacific and the Missouri, Kansas & Texas railroads, and the United States land surveys. The map is on a scale of eight miles to the inch, is excellently drawn and well lithographed, and makes a very clear and handsome sheet. Wherever routes are surveyed, the topography is indicated, showing for the western part of the territory a country where the streams have generally rather narrow valleys inclosed by considerable hills. In the extreme west, streams are few, and the little ponds affording the necessary water for marches are noted, and plains destitute of grass are named. We are glad to see (what we do

not always see on maps) that there has been no attempt to put in topographical features where the country is not explored.

This territory is not now much considered as a field for railroads, though an extension of the Atlantic & Pacific diagonally across it is a part of the Texas & Pacific plan now before Congress. But it is probably the most valuable for agricultural purposes of all our territories, and were it not devoted to the Indians the eastern part of it would probably be settled very rapidly, and there would be a field for new railroads there.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Worcester & Nashua.—At the annual meeting in Worcester, Mass., Jan. 20, the following directors were chosen: Francis H. Kinnicut, Stephen Salisbury, Francis H. Dewey, J. E. Smith, Isaac Davis, Worcester, Mass.; Jacob Fisher, Lancaster, Mass.; Charles H. Waters, Groton, Mass.; Thomas Chase, Calvin B. Hill, Nashua, N. H. The board re-elected Francis H. Kinnicut, President; T. W. Hammond, Clerk and Treasurer. Mr. Waters succeeds Hon. A. H. Bullock as director, the only change made.

New Bedford.—At the annual meeting in New Bedford, Mass., Feb. 1, the following directors were chosen: Joseph Grinnell, W. J. Rotch, Andrew G. Pierce, Wm. W. Crapo, Chas. L. Wood, Horatio Hathaway, New Bedford, Mass.; Solomon H. Howe, Bolton, Mass.; Wm. Mason, Taunton, Mass.; Henry N. Bigelow, Clinton, Mass.; Hiriam A. Blood, Fitchburg, Mass.; Nathaniel Thayer, Joseph S. Way, Nathaniel H. Emmons, Francis E. Parker, Caleb A. Curtis, Boston. The board re-elected S. H. Howe President.

Huntingdon & Broad Top.—At the annual meeting in Philadelphia, Feb. 1, B. Andrews Knight was chosen President, with the following directors: Rathmell Wilson, C. d'Invilliers, John Devereux, Wm. Cummings, I. V. Williamson, James Long, Wm. Whitaker, Joseph H. Trotter, D. J. Morrell, Wm. P. Jenks, John B. Wood, C. W. Wharton.

Covington, Columbus & Black Hills.—This company was organized at Covington, Neb., Feb. 2, by the election of the following directors: H. D. Booge, C. D. Hedges, A. W. Hubbard, Sioux City, Ia.; James B. Hubbell, Mankato, Minn.; Andrew DeGraff, St. Paul, Minn.; George T. M. Davis, Robert White, New York.

Detroit, Lansing & Lake Michigan.—Mr. Allan Bourn is appointed Purchasing Agent, with office in Detroit, Mich.

New Orleans, St. Louis & Chicago.—Mr. John B. Kemp has been appointed Superintendent of the Mississippi Division, in place of L. H. Sellars, resigned.

Houston & Texas Central.—Mr. George W. Quinlan has been appointed Assistant Superintendent of the Northern Division and Waco Branch, in place of Mr. M. G. Carey, who has gone to the St. Louis, Kansas City and Northern. Mr. Quinlan's office is at Corsicana, Texas.

Saginaw Valley & St. Louis.—Mr. N. W. Morrill has been appointed Superintendent.

Boston, Clinton & Fitchburg.—Mr. E. F. Wetherell has been appointed General Passenger and Ticket Agent.

St. Croix & Penobscot.—At the annual meeting in Calais, Me.; recently, the following directors were chosen: George M. Porter, E. A. Barnard, Henry F. Eaton, H. N. Hill, W. W. Sawyer. The board elected George M. Porter, President; Frank Nelson, Clerk; Samuel Black, Treasurer; W. W. Sawyer, Superintendent.

Boston, Barre & Gardner.—At the annual meeting in Worcester, Mass., Feb. 2, the following directors were chosen: Stephen Salisbury, Calvin Foster, Wm. W. Rice, Lewis Barnard, Clark Jillson, Wm. H. Morse, Worcester, Mass.; Levi Heywood, Charles Heywood, Gardner, Mass.; Isaac N. Ross, Holden, Mass.; Nelson D. White, Winchendon, Mass.; Ginery Twichell, Brookline, Mass.

Alabama & Chattanooga.—The following appointments are announced: Acting Treasurer and Auditor, Lt. A. Bacon; Assistant Superintendent, Frank L. Wadsworth; General Freight and Ticket Agent, M. Grant; Superintendent of Motive Power and Cars, John McVay; Superintendent of Telegraph and Train Dispatcher, Thomas J. Hewlett. Messrs. Bacon, McVay and Hewlett were formerly on the Western of Alabama.

Indianapolis, Bloomington & Western.—The following changes are announced by circular: Col. C. C. Smith having retired from the position of General Manager, that office is abolished. Gen. P. Pease is appointed General Superintendent, with office in Indianapolis; Mr. A. H. Wood, Assistant General Superintendent, with office at Urbana, Ill.; J. F. Richardson, Superintendent of Construction and E. P. Miller, Purchasing Agent, with offices in Indianapolis.

Eric Souther.—The directors of this new company are as follows: Thomas H. Carroll, John Clemens, John R. Cochran, J. F. Downing, W. A. Galbraith, J. W. Hammond, Joseph Johnson, Orange Noble, Lloyd G. Reed, W. Spenser, Erie, Pa.; A. B. Ross, Cambridge, Pa.; Isaac R. Taylor, Edinboro, Pa. The officers chosen are: Thomas H. Carroll, President; W. Spenser, Secretary; J. F. Downing, Treasurer; W. L. Bridgen, Chief Engineer; G. W. F. Sherwin, E. C. Norris, Assistant Engineers.

Louisville & Nashville.—The following circular has been issued:

"The office of Superintendent of Machinery has been merged with that of Road Department, and Mr. Fred. de Funik, present Chief Engineer, is appointed to the joint position, to take effect on Monday, Feb. 7, 1876."

Cleveland & Newburgh.—The following officers were recently chosen for the ensuing year: President, Reuben Riblet; Secretary and Treasurer, H. A. Spencer; Superintendent, C. Labarge.

Montreal, Portland & Boston.—At the annual meeting in Montreal, P. Q., Jan. 19, the following directors were chosen: Thomas Ryan, Wm. Angus, Charles Gill, J. C. Holton, James S. Clark, Edward H. Gott, Michel Mathieu, John C. Baker, S. R. Whitman.

St. Louis & Maine Valley.—At a meeting held in St. Louis, Feb. 3, this new company was organized and the following officers chosen: James C. Edwards, President; Gen. D. M. Frost, Vice-President; J. Philip Krieger, Jr., Secretary and Treasurer; G. L. Bobb, Assistant Secretary, and B. Graham Frost, Attorney.

Spring Hill & Parrsboro.—At the annual meeting in St. John, N. B., Feb. 1, the following directors were chosen: Edwin Fisher, R. P. McGivern, George McKean, John McMillan, Wm. Magee, George F. Smith, St. John, N. B.; John Taylor, Halifax, N. S.

Framingham & Lowell.—At the annual meeting in South Framingham, Mass., Feb. 2, the following directors were chosen: E. P. Carpenter, Harrison Bliss, Hiram A. Blood, George A. Torrey, S. H. Howe, Lyman Nichols, P. B. Brigham, Ralph Warner, Daniel Wetherbee, James W. Clark, Wm. F. Ellis, Edward Hastings, S. B. Rogers. The road is leased to the Boston, Clinton & Fitchburg.

Belvidere Delaware.—At the annual meeting in Trenton, N. J., Feb. 7, the following directors were chosen: Charles S. Greaves, Belvidere, N. J.; Charles Bartles, Flemington, N. J.

Ashbel Welch, Lambertville, N. J.; Lewis Perrine, Trenton, N. J.; George B. Roberts, Josiah Bacon, Strickland Kneass, John M. Kennedy, A. J. Derbyshire, Philadelphia. The road is leased to the Pennsylvania. The board elected Ashbel Welch President and Hugh B. Ely Secretary and Treasurer.

Flemington.—At the annual meeting in Trenton, N. J., Feb. 7, the following directors were chosen: Ashbel Welch, Charles Hartles, Alexander Wurts, W. B. Emery, John C. Hopewell, Robert F. Stockton, Benjamin Fish, Samuel Lilly, Thomas B. Fidler. The board re-elected Ashbel Welch President and Hugh B. Ely Secretary and Treasurer. The road is leased to the Pennsylvania.

Providence & Worcester.—At the annual meeting in Providence, R. I., Feb. 7, the old board was re-elected, as follows: Wm. S. Slater, Earl P. Mason, James Y. Smith, George A. Leete, John R. Balch, Moses B. L. Goddard, Providence; Gideon L. Spencer, Pawtucket, R. I.; Lyman A. Cook, Woonsocket, R. I.; Estus Lamb, Blackstone, Mass.; Paul Whitin, J. C. Whitin, Whitinsville, Mass.; Isaac Davis, Henry Chapin, E. B. Stoddard, Worcester, Mass.; Eben B. Phillips, Boston.

Mercer & Somerset.—At the annual meeting in Trenton, N. J., Feb. 7, the following directors were chosen: Ashbel Welch, Lambertville, N. J.; Thomas Hanlon, Augustus Van Zandt, Pennington, N. J.; Levi T. Atchley, Hopewell, N. J.; Martin A. Howell, New Brunswick, N. J.; A. L. Dennis, Newark, N. J.; Lewis Perrine, Benjamin Fish, Trenton, N. J.; Strickland Kneass, George B. Roberts, Thomas A. Scott, Philadelphia. The board re-elected Ashbel Welch President; Hugh B. Ely, Secretary and Treasurer. The road is leased to the Pennsylvania.

Montpelier & Wells River.—In the suit brought by the bondholders the Court has appointed W. H. H. Bingham, of Stowe, Vt., and S. T. Thompson, of Lyndon, Vt., receivers.

Eastern.—At the annual meeting in Boston, Feb. 7, the following directors were chosen: Onslow Stearns, Benjamin E. Bates, Boston; John Cummings, Woburn, Mass.; Samuel C. Lawrence, Mass.; J. S. Ludlam, Lowell, Mass.; George W. Gill, Worcester, Mass.; Frank Jones, Portsmout, N. H.; James W. Johnson, Enfield, N. H.; G. S. Morison, New York. Of these Messrs. Lawrence, Jones, Johnson, Bates and Cummings were members of the old board; Mr. Gill is one of the largest stockholders; Mr. Stearns is President of the Old Colony Company. Mr. Ludlam is a large creditor, and Mr. Morison is agent of Baring Brothers, and, until recently, was Principal Assistant Engineer of the Erie Railway. The three last were nominees of the creditors.

Bay Ridge.—The directors of this company are as follows: F. Grosjean, M. G. Johnson, Horace A. Miller, Henry L. Wyckoff, A. H. Hubbard, E. S. Backhouse, P. Wyckoff, J. H. White, P. H. Reed, J. D. Douglass, J. Wild, P. Van Alstein, Abram Wakeman. The officers are: Abram Wakeman, President; Samuel A. Wood, Secretary and Treasurer; S. McElroy, Chief Engineer.

Havana, Rantoul & Eastern.—At the annual meeting recently the following directors were chosen: Moses Baker, Samuel Finney, Robert Fisher, James Goodwine, Jesse Mehany, Rantoul, Ill.; Milo C. Dewey, Plano, Ill.; Isaac Van Ordstrand, Worthys, Ill.; Francis Low, Havana, Ill.; Thomas Hedges, Burlington, Ia.

Seattle & Walla Walla.—At the annual meeting in Seattle, W. T., Jan. 10, the following directors were chosen: Capt. Wm. Renton, A. A. Denny, F. Matthias, John Collins, J. McNaught, J. M. Colman, A. Mackintosh, Baileyt Gatzert, H. L. Loucks, C. H. McConkey, A. C. Manifold, R. B. Patterson, Michael Schall, C. H. Stubbs, Wm. Wallace.

Missouri, Kansas & Texas.—Mr. James D. Brown, heretofore General Ticket Agent, has been appointed General Passenger Agent, and the office of General Ticket Agent is abolished. Mr. T. W. Teasdale, late of the St. Louis, Kansas City & Northern, has been appointed Assistant General Passenger Agent.

Hartford & New York Steamboat Co.—At the annual meeting in Hartford, Conn., Jan. 20, the following directors were chosen: C. Benton, E. T. Smith, C. H. Northam, C. F. Browning, Hartford, Conn.; H. G. Hubbard, Middletown, Conn.; W. H. Goodspeed, East Haddam, Conn.; H. Gildersleeve, Portland, Conn. The board re-elected C. Benton, President; W. H. Goodspeed, Vice-President; A. W. Warner, Secretary and Treasurer.

Waynesburg & Washington.—At the annual meeting in Waynesburg, Pa., recently, the following directors were chosen: C. A. Black, W. Bryson, James Dunn, John C. Flemmen, John T. Hook, Thomas Iams, Silas Loughman, Samuel Luse, John Munnell, A. A. Purman, John G. Ritchie, John Ross, Simon Rinehart, H. C. Sayers, Jacob Swart, John D. Wood. The board elected officers as follows: President, John G. Ritchie; Vice-Presidents, C. A. Black, W. Bryson, John B. Flemmen, Silas Loughman; Secretary, B. F. Flemmen; Treasurer, L. K. Evans.

Institution of Civil Engineers.—At the fifty eighth annual meeting, Dec. 21, last, the ballot for council for the ensuing year resulted in the election of George Robert Stephenson, President; James Abernethy, Sir William George Armstrong, C. B., William Henry Barlow and John Frederick Bateman, Vice-Presidents; Sir Joseph William Bazalgette, C. B., I. Lowthian Bell, M. P., George Berkley, Frederick Joseph Bramwell, George Barclay Bruce, James Brunner, Sir John Coode, Harrison Hayter, William Pole, C. Willans Siemens, Sir Joseph Whitworth and Edward Woods, Members of Council; and Thomas Brassey, M. P., Douglas Galton, C. B., and Joseph Whitwell Pease, M. P., associates of council.

During the year there was an increase of 35 in the number of members, of 126 in associates, and a decrease of one honorary member. At the end of November there were 826 members, 1,449 associates, and 14 honorary members, besides 328 students.

PERSONAL.

—Mr. Robert B. Cabeen, a well-known iron merchant of Philadelphia and a prominent director of the Philadelphia & Reading and its allied companies, died at his residence in Germantown, Pa., Feb. 3. He was in his 65th year, and a man of large property.

—Mr. J. E. Reynolds, Paymaster, and Mr. A. J. Perrin, Roadmaster of the Peninsula Division of the Chicago and Northwestern, were killed by an accident near Ishpeming, Mich., Feb. 2. The pay car jumped the track and upset down a bank, and they were caught and crushed underneath the safe.

—Hon. Andrew K. Hay, President of the Camden & Atlantic Railroad Company, is lying dangerously sick at his residence in Winslow, N. J.

—Mr. G. B. Simonds, Master Mechanic of the Middle Division of the Missouri Pacific, was recently presented with a silver service by the engineers of his division.

—Mr. W. G. Broughton has resigned his position as General Superintendent of the Belleville Line of the St. Louis, Alton & Terre Haute Railroad.

—Mr. J. Browner, Master Bridge Builder of the Toledo, Peoria & Warsaw road, died very suddenly at his residence in Winslow, N. J.

La Harpe, Ill., Jan. 31. He had been on the road for a number of years.

—Dr. Estep Hall, a director of the Baltimore & Drum Point Company, was thrown from his carriage and instantly killed Feb. 3, while on his way from his farm at Owingsville, Md., to Annapolis, to attend a meeting of the board.

—Mr. O. M. Head resigned his position with the Baltimore & Ohio Railroad at the Locust Point terminus, Jan. 1, to assume the business management of the Baltimore *Gazette*.

—The report that Mr. George Batchelder was about to resign his position as Superintendent of the Eastern Railroad is denied.

—Mr. Andrew Reasoner, Superintendent of the Morris & Essex Division Delaware, Lackawanna & Western Railroad, has been suffering from a severe attack of pneumonia and is still unable to leave his residence at Morristown, N. J.

—Mr. Samuel Woodward, who recently resigned the position of General Superintendent of the Indianapolis & St. Louis, was presented with a valuable silver set at Indianapolis, Feb. 7, by his friends on the road.

—Mr. H. M. Flint, Superintendent of the New York & Oswego Midland road, was fatally injured by being scalded, Feb. 2, the engine on which he was riding being thrown from the track and down a bank into the Willowemoc Creek. He died on the 6th. Master Mechanic Minshall, who was riding on a snow-plow which left the track at the same time, was badly bruised.

OLD AND NEW ROADS.

International Ocean Telegraph.

At a meeting held in New York, Jan. 27, it was resolved that it was desirable to retire the preferred stock, and that it should be exchanged for common stock on the basis of three shares of common for two of preferred. The subject was referred to the directors, with authority to secure consent of holders of preferred stock in writing, no exchange to be made until the consent of 90 per cent. of that stock is had. The preferred stock is now \$650,000 and the common stock \$350,000. When the exchange is made there will be \$1,925,000 common stock.

Illinois Central.

The General Manager, Mr. James C. Clark, has issued the following circular to the officers of the road:

"Greater care must be observed to avoid accidents or damage to persons or property transported over our road. Require renewed care on the part of the employees to prevent injury and damage to the company's property. Economy in the use of supplies or materials of every kind. Buy nothing we can do without. Make what we have on hand answer, rather than buy new supplies or materials. Allow no more engines or trains to be run than are necessary to do the business offered. Avoid hauling empty cars, when possible to do so, and particularly hauling empty cars in both directions. Require train masters to run frequently over their sections; not only to observe the movements of trains and employes, but to see that the wants of their sections are properly supplied. Run trains at slow speed; this saves track, rolling stock and machinery, and insures safety. See that no more force is employed at stations, or in the operation of the road, than is necessary to transact the business economically; and also see that stationery, fuel, oil, etc., are not unnecessarily used or wasted. Cut off all expenses which it is possible to do, in every branch of the service; the savings which may be accomplished in this way will produce a large amount of net revenue. Deal justly and fairly with all your employees; then require each one to perform his duties faithfully; allow no shortcomings to be overlooked; officers and employes must be made to feel that it is their duty to serve the company with devotion and fidelity. Let there be the fullest and freest intercourse at all times between superiors and subordinates on all matters affecting the business and interests of the road. The owners of this property expect good results at our hands; with the close of the present year they must not be disappointed."

Springfield & New London.

At the annual meeting in Springfield, Mass., Jan. 26, it was stated that the cost of the road thus far had been \$156,395, of which \$113,399 was for grading and rails, \$25,777 for land damages and the rest for engineering, depots, etc. Other items to come will bring up the cost to \$185,000, or \$26,419 per mile. The lease to the Connecticut Valley is for five years, the rental to be \$8,000 the first year, \$8,500 per year for the next three, and \$9,000 the fifth year.

Waynesburg & Washington.

At the recent annual meeting in Waynesburg, Pa., it was stated that 22 miles have been graded and ties for the road contracted for at an average of 20 cents each. The total amount of subscriptions collected up to Dec. 31 was \$34,905.79, and \$24,091.31 had been paid out on account of engineering, right of way, ties, road-crossings and incidentals. The President recommended that the balance of the subscriptions be called in and the iron contracted for at once.

Indianapolis Mineral.

Articles of incorporation have been prepared for a company by this name, which proposes to build a railroad from Indianapolis southwest about 85 miles to Sullivan on the Evansville & Crawfordsville road, with a branch from a point not yet decided on to Nashville and possibly Bedford. The road is intended to develop the coal and other mineral resources of the country through which it will pass. The main line would about bisect the triangle formed by the Terre Haute & Indianapolis and the Indianapolis & Vincennes roads with the Evansville & Crawfordsville as a base.

Montreal, Portland & Boston.

At the annual meeting in Montreal, Jan. 19, it was resolved that the subsidy granted by the Province of Quebec be applied to the construction of the railroad from St. Lambert to the Province line by the way of West Farnham and Freleighburgh, as authorized by the Legislature at its last session.

Antaltic & North Carolina.

The change of the gauge of this road from 4 feet 8½ inches to 5 feet was completed Jan. 29, and the cars of the North Carolina road can now run through to Newberne and Morehead City again. The road is 93 miles long, from Goldsboro, N. C., to Morehead City, and the change of gauge was made necessary by that of the North Carolina road, its chief connection.

St. Louis & Maline Valley.

A company by this name has been organized in St. Louis to build a railroad about 14 miles long, from the crossing of the Florissant road on the St. Louis, Kansas City & Northern road southward to the Manchester road and then eastward into the center of the city. The capital stock is fixed at \$150,000. It is probably intended to give the St. Louis, Kansas City & Northern a new line to the Union Depot.

Alabama & Chattanooga.

An attempt was made to prevent the new trustees from taking possession of the property in Chattanooga by Wm. Crutchfield and others, who hold claims for about \$160,000 against J. C. Stanton which are secured by judgment liens on the terminal property, which was sold by Stanton to the road. These parties asked for and obtained a preliminary injunction to restrain the transfer of this property to the new trustees. Subsequently, however, the parties consulted to-

gether and agreed to withdraw the injunction, which was done. The new trustees took formal possession on behalf of the bondholders, Feb. 1, in accordance with the order of the United States Circuit Court.

Attica & Arcade.

Work on this road has been suspended in consequence of an injunction obtained by the town of Sheldon, N. Y., which is bonded in aid of it.

Canada Southern.

It is proposed to build a branch about eight miles long from Charing Cross, Ont., to Chatham. The line has been surveyed, and the cost is estimated at \$75,000. It will probably be built if Chatham will offer a sufficient bonus.

Toledo, Wabash & Western.

The Protective Committee gives notice that, a sufficient number of the shareholders having paid in their contributions toward legal expenses to warrant the Committee in proceeding with defensive measures, they have organized for a vigorous opposition to the foreclosure of the gold-bond mortgage. All cost have been retained, and a careful examination of the case has developed points in favor of the stockholders.

The foreclosure suits in both the Indiana and Illinois courts will come up very shortly. Judge Robert G. Ingersoll, of Peoria, Ill., has charge of the defense for the stockholders.

Quincy, Alton & St. Louis.

It is said that the lease to the Chicago, Burlington & Quincy road has been completed, and that that company took possession of the road Feb. 1.

Louisville, Cincinnati & Lexington.

Receiver McLeod's report for January is as follows:

Cash on hand from December.....	\$340,367.79
Receipts for the month.....	118,922.47

Total.....	\$459,300.26
Disbursements.....	106,385.98

Balance, Feb. 1.....	\$352,914.28
The receipts exceeded the disbursements for the month by \$12,546.49.	

Illinois Central.

The Land Department reports for January sales of 1,735.06 acres for \$12,511.86. Cash collected on land contracts amounted to \$20,360.28.

The Traffic Department reports earnings for January as follows:

1876.....	1875.....
In Illinois, 707 miles...\$461,283.21	Dec. \$26,907.51
In Iowa, 402 miles....127,163.35	107,080.81
	Inc. 20,132.64

Total, 1,109 miles...\$588,446.56	\$597,221.83
Dec. \$8,774.97	1.5

The earnings per mile in Illinois were \$452 and in Iowa \$316, the average for the whole line being \$531 per mile.

Delaware & Bound Brook.

The track is all laid from the junction with the New Jersey Central near Bound Brook, N. J., southwest to Hopewell, 16 miles. The work of surfacing and ballasting is in progress. The laying of the rails from Hopewell to the Delaware will be slightly delayed by some unfinished work at Moore's Mill, but will be completed next month, unless some unforeseen accident prevents.

From a statement to the Philadelphia Stock Exchange it appears that the capital stock authorized is \$1,500,000; issued, \$1,000,000. A first mortgage for \$1,000,000 has been executed, under which \$1,000,000 of bonds have been issued. The issue of the whole \$3,000,000 of stock and bonds will make the capital account \$111,000 per mile.

New Jersey Midland.

A meeting of the bondholders opposed to the Balestier plan of reorganization was held in New York, Feb. 3, when the new plan was submitted. It is, briefly, as follows:

1. The foreclosure being completed and the road bought, a first mortgage for \$350,000 to be executed and bonds issued to pay off the receivers' certificates and to meet necessary expenditures for equipment, right-of-way claims, etc.

2. Present first-mortgage bondholders to receive new bonds for the amount of their old bonds and accrued interest, such bonds to bear 7 per cent. interest payable in cash if earned, otherwise in scrip.

3. Stock to be issued equal in amount to the bonds and attached thereto.

On motion the plan was amended so as to authorize the issue of 7 per cent. income bonds for the amount of the principal and accrued interest of the present second-mortgage bonds.

The following committee was appointed to carry out the plan: Henry Marks, J. Wyman Jones, Remington Vernon, New York; F. A. Potts, Flemington, N. J.; L. H. Alden, Passaic, N. J.; John R. Daggers, Paterson, N. J.; N. R. Irvine, Trenton, N. J.; Wm. Evans, Middletown, N. Y.; J. N. Weed, Newburg, N. Y.; Robert E. Taylor, Poughkeepsie, N. Y.; D. P. Nichols, Danbury, Conn.; David Pendleton, Bridgeport, Conn.; B. Gilbert, Wilton, Conn.; T. Warner, Jr., Springfield, Mass.; T. W. Hammond, Worcester, Mass.

The plan as amended does not differ materially from that of the Balestier Committee, the chief point being in the amount of new first-mortgage bonds to be issued. Apparently it does not meet the views of all the bondholders, for the following advertisement appears in the New York papers:

"First-mortgage bondholders who adhere to an exclusive first-mortgage reorganization are requested to send their address to the advertiser, who is largely interested in these bonds. Having been betrayed by our professed friends who managed the meeting of Feb. 3, at No. 113 Broadway, who have proved themselves to be scheming professional railroad reorganizers, let us now consult together personally for our mutual protection. Circulars will soon be sent to those sending their address to First-Mortgage, Box 288 Times Up-town office, No. 1,257 Broadway, New York."

Meantime the Balestier Committee claim to have secured control of nearly three-quarters of the bonds and announce that the foreclosure proceedings are to be pushed to a conclusion at once.

Flint & Pere Marquette.

The trustees under the land grant mortgage, C. R. Tucker and O. Prescott, will receive at New Bedford, Mass., until Feb. 21, proposals for the sale to them of \$26,000 of the bonds of the issue of Sept. 4, 1868, for cancellation under the terms of the mortgage. Of the bonds \$6,000 must be from Nos. 1 to 600 and \$20,000 from Nos. 1,201 to 1,800.

Taxable Profits of Railroads.

A question of some interest is now being argued before the Commissioners of Internal Revenue at Washington on the application of the Houston & Texas Central Company to be allowed to deduct from the profits the discount on the sale of bonds premiums on the difference between gold and silver. Another point to be issued is the taxation of the interest on bonds after the principal of the bonds has become due, but has not been paid by the company.

Cleveland, Columbus, Cincinnati & Indianapolis.

For some time past the freight trains of this company have been systematically robbed by persons who obtained entrance to the cars by forcing the doors at one or two of the more secluded water stations, and then threw out goods while the

train was in motion, their operations being carried on at night. Detectives employed by the company succeeded in finding out the whole plan of these operations, and finally succeeded in capturing several of the thieves at a place near New London, O., last week. They were taken in the act, leaving no doubt of their guilt, and it is hoped that the gang has been broken up.

Peach Bottom.

Work is progressing on the extension of the Western Division, and the company expects to have it completed to Delta, Pa., 35 miles from York, by April 1. By the same time the Eastern Division will be finished to Dorsey's Mills. President Boyd writes: "We hope to complete both divisions to the Susquehanna during the coming summer. Our road is of 3-foot gauge, substantially built, is rendering entire satisfaction to all interested, and has a capacity for business far beyond what will be required of it for many years to come. We commenced to build before the late panic, but such has been the confidence of our people in the enterprise, that we have not been compelled to suspend work for one day for want of funds."

Baltimore & Ohio.

This company has submitted a proposition for an amicable settlement of all the points in dispute between it and the State of Maryland. A hearing of the proposition and of arguments in its favor before a joint committee of the Legislature was to be held at Annapolis, Feb. 8.

Dividends.

Dividends have been declared by the following companies: Pennsylvania, 2 per cent., quarterly, payable Feb. 29; Cleveland & Pittsburgh, 1½ per cent., quarterly, payable March 1.

Eastern.

A circular issued by Baring Brothers, of London, says that as they have shared the general confidence in the company to the extent of recommending its bonds to investors, they will take up the interest bonds in which it is proposed to fund the March and September coupons, and will pay in full those coupons on all the bonds issued through their house. If the plan for funding all the existing debt in new bonds to bear 3½ per cent. for three years, 4½ for three more, and 6 per cent. thereafter if finally adopted, they will pay, on all bonds issued by them, the difference between the current rate and 6 per cent. for the six years that the lower rates will prevail.

At the annual meeting in Boston, Feb. 7, there was a long and sharp but somewhat desultory discussion on the affairs of the road. The adoption of the creditors' proposition to fund all debts in a general mortgage was strongly advocated by General Butler and some others, who referred to the danger and ruin likely to come from bankruptcy proceedings. Finally resolutions were adopted referring the creditors' plan to the directors, with instructions to join the bondholders' committee in presenting it to the Legislature; directing the board to apply to the Legislature for the necessary authority to execute a mortgage upon the property; authorizing the board, if it should finally become necessary, to make application to put the company into bankruptcy; and to appoint a committee to make a thorough investigation of the company's affairs for the past six years, to enquire into all contracts and purchases, the connection of any director or officer therewith and the value of real estate or other property bought, and to report as soon as possible.

Five of the old directors and four new ones were chosen, three of the new men being nominees of the creditors.

Pennsylvania.

The total cost of the Market street bridge in Philadelphia, including the changes in the tracks over the Chestnut street bridge, was \$62,405.66, being \$2,594.34 less than the price (\$65,000) for which the company agreed to do the work.

Ground has been broken for a new passenger depot at Thirteenth and Market streets, West Philadelphia. The building is to be of brick, 185 by 100 feet, and three stories high. The first floor will consist of a waiting room 80 by 97 feet, with ladies' and smoking rooms, ticket and telegraph offices, restaurant and two baggage rooms, each 40 by 50 feet. The second floor will be used for offices and for the kitchen and other appendages of the restaurant. A carriage way, 35 feet wide, covered by a portico, will extend along the entrance on both streets.

Havana, Rantoul & Eastern.

The track is now laid for 10 miles westward from Rantoul, Ill., making the road 40 miles long from the Chicago, Danville & Vincennes crossing westward. At the recent annual meeting the total expenditure to date was reported at \$239,497.73, which includes \$38,750 for equipment. The company has 2 engines, 50 box, 30 coal, 2 caboose and 8 hand cars.

Wheeling & Lake Erie.

The directors have voted to adopt three feet as the gauge of the road and to complete it on that basis. Mr. McKee, who now has a contract for a part of the road, has submitted a proposition for the construction of the whole line from Wheeling to Sandusky and Toledo, work to be finished in two and a half years. It is said that he controls sufficient capital to carry out the contract, and the matter is now under consideration.

Chicago & Alton.

In the suit of this company against the Louisiana & Missouri River Company, the United States Circuit Court in St. Louis has sustained the demurrer to the original complaint, but gives leave to the plaintiff to file a new and amended complaint.

Farmer's Union.

It is said that this company, which is building a narrow-gauge road laid with wooden rails, has 20 miles of the line now in operation. This section extends from Beaman, Ia., west 12 miles to Liscomb, and from that place eight miles further west.

Washington City & Atlantic Coast.

This company, which has applied to Congress for a charter in the District of Columbia, proposes to build a railroad from Washington east by south through Upper Marlboro to a point on Chesapeake Bay in Anne Arundel County, Md. The distance is about 30 miles.

Montpelier & Wells River.

The adjourned hearing on the application for a receiver on the part of the bondholders was held at St. Johnsbury, Vt., Feb. 4. The hearing lasted until late at night, and the court finally granted the motion and appointed W. H. H. Bingham and S. S. Thompson receivers. The court also decided not to dissolve the injunctions heretofore granted against the board of directors claiming to be elected at the late meeting.

Long Island.

The preliminary injunction to prevent any of the directors from resigning has been dissolved and any further injunction refused. The same parties now hold the control of the flushing, North Shore & Central, the Southern and the Long Island roads, over 300 miles of road and including all the steam railroads on Long Island except three very short light passenger lines, two from Brooklyn to Coney Island and one from East New York to Canarsie. The first step of the new owners has been to put up the fares to competing points to former rates, passenger fares to several points, especially to Flushing, having been brought down to a very low point. The separate organization of the three companies will be kept up

as heretofore, although a considerable saving can be effected in management, as in agents at common points, etc. No change in officers is to be made just at present. The Southern Railroad trains will, as soon as arrangements can be completed, run to Hunter's Point, using the Long Island track from Jamaica. Train service will still be kept up between Jamaica and the Williamsburg terminus, but the main terminus will be at Hunter's Point, where that of the other two roads already is.

White Hall & Granville.

It is proposed to build a railroad from White Hall, N. Y., to Middle Granville, about 10 miles, thence connecting with the Rutland & Washington road. The object is to open a new line for lumber traffic from White Hall to Boston by the Rutland & Washington, the Troy & Boston and the Hoosac Tunnel Line.

Cleveland, Tuscarawas Valley & Wheeling.

Much discussion is going on in the towns on the line as to which of the two lines surveyed should be adopted for the proposed extension from Uhrichsville to Wheeling. By the Flushing route it is said that 6,650 feet of tunneling will be needed; on the New Athens route only 4,000 feet, and the latter is about a mile shorter. The two lines meet about 16 miles from Wheeling and are identical to that point.

Cleveland, Mt. Vernon & Delaware.

It is said that the company has resolved to build the proposed Dresden Branch this year. It will extend from Oxford, in Holmes County, O., south to Dresden, about 33 miles. For some 20 miles there is an old graded road-bed which can be used, and the only heavy work will be a tunnel 12 miles from Dresden. The company asks for \$75,000, to be raised along the line.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Eastern Kentucky, in Boston, Mass., Feb. 16.

Marietta & Cincinnati, in Cincinnati, O., Feb. 16. Transfer books are closed for 10 days before the meeting.

Housatonic, at the office in Bridgeport, Conn., Feb. 25, at 2:30 p. m.

Union Pacific, at the office, No. 42 Equitable Building, Boston, March 8, at 10 a. m. Transfer books will be closed from Feb. 26.

Northern Central.

The Baltimore *Gazette* says: "The work on the new elevator at Canton is progressing favorably, though it has not yet reached above the foundation. The structure will be 84 by 150 feet, and is to be built at the end of a pier 500 feet long by 100 feet wide. The foundation will rest upon 4,000 piles, which are cut off six feet below the surface of the water. Upon these piles will be sunk a platform of double layers of twelve-inch stuff, surmounted by stone work nine feet in height. Upon this will be built the elevator proper."

"The coal piers now rapidly approaching completion will probably be the largest in the country. They present an imposing appearance, reaching far out into the waters of the Patapsco River, and are in length 1,200 feet, with numerous shutes. Six hundred feet of these piers are 142 feet wide. Five tracks will be laid upon the greatest width, and three upon the narrow part. The piers are located at Lower Canton. Mr. E. O. McClellan, Superintendent of the work, states that he has 400 men employed upon the various enterprises now progressing at Canton."

"Just east of the new elevator a large force of laborers are engaged in grading and filling up a lot of ground 700 feet front and running back 1,500 feet to Third street, upon which is to be erected the depots and storehouses of the Northern Central and Union railroad companies, which will prove to be striking improvements."

Maine Central.

The board has resolved to continue the running of the Pullman train between Portland and Bangor, the Pullman Company having agreed to put lighter cars on this route.

Keokuk & Des Moines.

In view of the falling off in business for the last three months, and the reduction of rates caused by the working of the Iowa law, the board has ordered a general reduction of 10 per cent. in all salaries paid by the company. There is naturally a good deal of dissatisfaction among the employees, who claim that their pay is already very low.

Bay Ridge.

A contract has been let to Beard & Hanlon for the grading, bridging, track laying and ballasting of this road. Work is to be begun at once and completed by July next. The contract price is \$97,500, or \$12,200 per mile, which apparently does not include the rails. The right of way has been given for much of the distance. The road is to run from Bay Ridge, on New York Bay, just south of Brooklyn, L. I., through Parkville to East New York, where it connects with branch of the Long Island road; it will be eight miles long.

Tyler Tap.

A new contract has been let for the grading of 32 miles of this road, beginning at Gilmer, in Upshur County, Texas, and work is to be pushed.

Wilmington & Reading.

The holders of about \$600,000 of the \$1,200,000 first-mortgage bonds have agreed to join in the plan for the purchase and reorganization of this road, and have deposited their bonds with the Fidelity Trust and Safe Deposit Co., of Philadelphia. It is thought that others will come in. The foreclosure of the first mortgage is to be pushed as quickly as possible.

Western North Carolina.

The managers have now 250 convicts at work between Old Fort, N. C., and the Swannanoa tunnel, and another force has been put on the grading between Paint Rock and Asheville. The contract for all the tunneling has been let.

Quincy, Missouri & Pacific.

Meetings continue to be held in favor of the proposed extension of this road westward to the Missouri River, and several local committees have been organized to work to that end.

Somerset.

A meeting was recently held in Augusta, Me., of advocates of the completion of this road and the line of which it is to form a part. Arrangements were completed for pushing work on the road next season.

The line referred to is to extend from the Maine seaboard to Quebec, and is made up of the Wiscasset & Kennebec road, from Wiscasset to Augusta, 25 miles, on which work has not yet been begun; the Messalonskee & Kennebec, from Augusta to West Waterville, 19 miles, on which also no work has been done; the Somerset, from West Waterville to the Canada line, 107 miles, of which 25 miles, from West Waterville to North Anson, is completed, and the Lewis & Kennebec, from the Canada line to Lewis, opposite Quebec, 90 miles, of which 45 miles from Lewis southward is in operation. The whole line is 241 miles, of which 70 are completed.

Oaire & Tennessee River.

There is a revival of interest in this project, and an effort is to be made to begin work. The road is to run from the Ohio River opposite Cairo, Ill., southwest to Paris, Tenn., whence one branch will run southward to the Tennessee River at Clif-

ton in Wayne County, and the other southwest to Columbus, S. C., the Nashville & Decatur road.

Louisville, New Albany & Chicago.

During the past year considerable improvements have been made in the road-bed, track and equipment of this road. Recently a steam shovel and gravel train have been put at work to eat down the sand bank at Michigan City and to raise the track through the swamp some five miles to the south of that place. Both will be great improvements to the road.

Lafayette, Muncie & Bloomington.

A special meeting of the stockholders was held in Lafayette, Ind., Feb. 1, to consider the question of ratifying the Eels contract under which the line from Lafayette to Muncie has been completed. The President, Mr. Heath, read a long report giving an elaborate history of the company and of the contract in question and of the proceedings under that contract. He denied the charge that he, or any of the directors, were interested in the contract.

Mr. Earl, the former President of the company, attempted to read a report, but was refused a hearing. A written protest was presented by some stockholders, but was laid on the table. Judge Templar, of Muncie, attempted to speak against the ratification, but much confusion followed and he was obliged to stop. The meeting then voted to adopt Mr. Heath's report and to ratify the contract, and shortly after adjourned.

Atlantic & Great Western.

In London, Jan. 27, a special meeting of first mortgage bond holders was held at which it was voted to confirm the appointment of a committee and to request the members to continue their services until the reorganization scheme is carried through, and also to approve the revised official scheme of arrangement. In answer to questions it was stated the committee would not act in any way with Mr. James McHenry, in the future, and that the office would be changed as soon as possible. The committee consists of John C. Conyheare, Rev. J. Lockington Bates, George T. Rait, T. B. Forwood, T. S. O. Skelemerine, John Caw, Jr., S. P. Gaskell, James Wilson, Jr., and M. O'Shaughnessy.

Immediately after this meeting of first-mortgage bondholders there was held a meeting of all classes of share and bondholders to consider the revised official scheme of arrangement issued by the committee of bondholders and Mr. James McHenry, at which Mr. Charles E. Lewis, M. P., presided. Mr. Lewis said:

He believed that since the line went into receivership they were represented by men who were honorable and consistent in their custody. With regard to the future organization of the company, inasmuch as they had a well-constructed line, showing a definite traffic, it was their duty not to throw away the last chance of placing the property on a fair and substantial basis. The reorganization scheme, which had been before them for six months, ought to be rejected by the meeting if it was manifestly unjust in any material particular, but if not it ought to be swallowed even if it had small imperfections. He would place the scheme before them in six propositions. First, its effect would be to give a direct control to the bondholders over the whole property. Secondly, it would give practical means at stated intervals for a full opportunity being given to all parties interested to obtain information and criticise discussion here in London. Thirdly, by this scheme there was a provision which prevented any body of men connected with the company having the power to create new obligations or to enter into new leasehold arrangements without the consent of first and second mortgage bondholders; fourthly, existing priorities and securities were respected; fifthly, the creation of the lion charge under this scheme was only for absolute and necessary purposes, without the creation of which, in order to raise money, every charge existing in the company would be more or less damaged; sixthly, there were absolute provisions by which bondholders' interests in the future were prevented from being sacrificed by the exercise of the voting power of merely nominal or bogus shares. This scheme had received the assent of thirty-three million dollars of the mortgage bonds. With respect to Mr. James McHenry he did not know him; but the first thing he resolved on his return from America was that he would not attend a meeting of the trustees at Mr. McHenry's office. He believed the success of the scheme depended upon two things—that the bondholders all over the kingdom should understand that there was no backstairs influence at work, and that there was no pulling of the strings by any individual behind the trustee, and above all that no one who had had any concern in a previous organization or disaster should have the opportunity of touching their money.—(Applause). He told the trustees that they must all place their resignations in the hands of the bondholders, and be appointed anew. He found much to his dislike that the expenses of the reorganization scheme were being paid by Mr. McHenry. It was their intention to start afresh with a clean slate, to change the offices, and in some cases the officials. He believed that trade would not revive in America till after the Presidential election, but that when it did daylight would break upon the prospects of the company.

The Rev. Mr. Bates moved the adoption of the scheme, which he said was really the scheme of the bondholders' committee and not Mr. McHenry's. They had asked the first-mortgage holders to give up their rights of foreclosure for ten years. If the property was to be developed into a prosperous concern, Mr. McHenry must cease his connection with it.—(Applause).

At this meeting also the scheme of reorganization was adopted almost unanimously.

Grand Trunk.

Some months ago Mr. Potter, President of the Grand Trunk Railway of Canada, wrote a letter to the London *Times* protesting against the construction of new railroads in Canada to compete with the Grand Trunk, and discouraging the investment of English capital in such enterprises. Mr. C. J. Brydges, late Manager of the Grand Trunk, and now General Superintendent of Government Railways for the Dominion, replied to Mr. Potter's letter, which he treated as injurious to Canadian credit. Mr. Potter rejoined, using freely Mr. Brydges' own letters while on the Grand Trunk, and now Mr. Brydges has published another letter. The cost and the income of the Grand Trunk have been among the matters discussed, Mr. Potter having stated the cost at £30,000,000, and Mr. Brydges at half as much. In his last letter Mr. Brydges says:

"In fact, about £11,000 per mile represents the real cash cost of the Grand Trunk, or a total of £15,000,000, of which £12,000,000 has been provided in cash from London—the company's own reports showing that in 1874 they earned a net profit of about £60,000, or nearly 4 per cent. on the net cash outlay. But the company's nominal capital has, however, been swollen to about £35,000,000 by issuing bonds and shares at an enormous discount."

Boston & Albany.

President Chapin has written an open letter in reply to the charges made by State Director Hayes. He charges him with misrepresentations and misstatements, and asserts that no dividend has been made which has not fairly been earned. It has been the company's practice to charge to construction account only such items as represented actual permanent improvements and increase in the value of the property. Everything else has been put down to expense account. As to the Ware River matter, he repeats that he bought the controlling interest in that road at the request of the board of directors.

After completing the road and carrying it through the panic, he offered to sell it to the Boston & Albany for his actual outlay, with 7 per cent. interest added. This was not thought best by the board, and the lease was subsequently arranged. In conclusion, he asks the stockholders that a thorough and searching investigation be made.

It is plain enough that much of the local agitation and talk about these matters is being stirred up by parties interested in the Hoosac Tunnel line, possibly to divert attention from the investigation with which the tunnel contracts and other matters are threatened, and certainly to make the way easier for the new appropriation they want from the Legislature this year by fomenting distrust and dislike of their great rival.

Easton & Amboy.

The following as to condition, cost, etc., of this road is from the report of the Lehigh Valley Railroad Company for 1875: The grading is all done for double track, except embankment over Musconetcong River, cut at Flaggtown (which was to be completed in December) and the sloping of cuts between West End and Lansdown and Metuchen and Perth Amboy. With these exceptions the road-bed is well sloped and of good width. At Metuchen a connecting track with the Pennsylvania Railroad 0.55 mile long has been laid and 1.02 miles of sidings to accommodate exchange of traffic.

The whole amount of track laid is as follows:

	Miles.
Main track.....	60.0
Second track.....	57.5
Sidings at line points.....	7.0
Stand tracks for cars at Perth Amboy and terminal tracks.....	7.0
Dock and wharf tracks at Perth Amboy.....	12.5
Total.....	144.0

Of the 117.5 miles of main and second track 60.5 miles are of steel and 57 miles of iron rails, 68 pounds to the yard. The 2.5 miles remaining to complete second track will be of steel. The sidings are laid chiefly with 50-pound iron rails; the dock and wharf tracks, 40-pound iron rails. The second track yet to be laid is one-half mile at Musconetcong fill, one-fourth mile near Lansdown, three-fourths mile at Flaggtown and one mile in Perth Amboy.

Water tanks have been built at Perth Amboy, Metuchen, Bound Brook, Neshanic, Flax Mill, Lansdown, Pattenburg and Bloomsbury; coal trestles at West End, Pattenburg, Neshanic, Bound Brook and Metuchen; depots are completed at New Market, Neshanic, Lansdown, Pattenburg and Bound Brook. At Perth Amboy two shipping piers have been finished and another is in progress, besides a pier for iron and general freight. A brick engine house for 20 engines, a semi-circle 300 feet in diameter, has been built with turn-table and coaling station; a car-shop 55 by 150 feet with boiler-house and storehouse, all of brick, are nearly completed, also an office building and a boarding-house for employees.

The cost of the property has been:

For construction, bridging and track.....	\$6,659,407 19
Right of way.....	979,404 87
Perth Amboy real estate and wharves.....	813,643 12
Real estate, taxes and sundry other items.....	53,412 16

Total..... \$8,499,867 34

The road has cost \$141,664 per mile, or, excluding the cost of the terminal property, \$128,104 per mile. It included some very heavy work, notably the great Musconetcong tunnel.

For the five months of the fiscal year that it was open for traffic the road carried 397,371 tons of coal, of which 348,992 tons went to Perth Amboy for shipment and 48,379 tons were delivered to local points or to Pennsylvania Railroad at Metuchen.

New Bedford.

At the annual meeting in New Bedford, Mass., Feb. 1, there was quite a strong expression of feeling against the proposed consolidation with the Boston, Clinton & Fitchburg Company. This was, indeed, strong enough to secure the election of four new directors in place of those who were supposed to be advocates of consolidation. The Boston, Clinton & Fitchburg now works the road under a lease.

Columbus & Toledo.

Three additional instalments of 10 per cent. each on all stock subscriptions are called in. They are payable Feb. 10, March 10 and April 10. Work on the grading and masonry is stated to be progressing rapidly, the weather thus far having been unusually favorable for its prosecution by the contractors.

Paris & Danville.

Receiver Eads has begun suit to enforce the payment of the subscription voted to this road by the town of Danville, Ill., which has not been paid, the town withholding it on the ground that the company has not complied with its part of the contract.

Toledo, Peoria & Warsaw.

Receiver Hopkins reports as follows for the months of December, 1875, and January, 1876:

Balance on hand Dec. 1.....	\$19,354 41
Receipts in December.....	152,700 86
" " January.....	133,558 27
Total.....	\$305,613 54
Disbursements in December.....	\$138,629 07
" " January.....	164,686 19
Total.....	303,315 26

Balance, Feb. 1..... \$2,298 28

In December the receipts exceeded the disbursements by \$14,071.79; in January the disbursements were \$31,127.92 greater than the receipts, showing an excess of payments over receipts of \$17,056.13 for the two months.

Mealsalonskies & Kennebec.

Mr. T. Appleton has offered to build this road complete and ready for use for \$12,000 per mile. The road is intended to be an extension of the Somerset Railroad and to run from West Waterville, Me., southward to Augusta, about 19 miles.

Boston & Maine.

It is said that the employees of this corporation feel very sore over the reduction of wages, and that 40 of the enginemen have resisted President White that, unless their pay is restored to the basis existing before the last reduction, they will stop work. The reduction made was 10 per cent. and in the last of several made within the past two years.

Foreclosures in New Jersey.

A bill now before the New Jersey Legislature provides that when a foreclosure of mortgage is had on the property of a company whose main organization is in another State, but whose road extends into New Jersey, an auxiliary suit may be brought in New Jersey and shall run together with that in the adjoining State, and under the decree so granted the property may be sold in such adjoining State. A new company organized after the foreclosure shall succeed to all the rights and franchises of the old one. The bill is general in its terms, but is believed to have special reference to the case of the Erie.

Philadelphia & Reading.

The committee of the Pennsylvania Legislature appointed to investigate the affairs of this company and the Philadelphia & Reading Coal & Iron Company has made its report. After detailing the proceedings had, the testimony taken and the arguments heard, the committee comes to the conclusion on the

first point, the constitutionality of the charter of the Coal & Iron Company, that it is a question for the courts, on which it can give no opinion. The evidence has been submitted to the Attorney General, and if the charter is unconstitutional or if either of the companies have violated or forfeited their charters, it is in his power to proceed against them. It is clearly beyond the power of the Legislature to dictate the action of the Attorney General or the Supreme Court upon such a matter, and the case comes exclusively within their province.

As to the charge of conspiracy to control the mining, transportation and price of coal, it is the province of the Legislature to investigate and, if necessary, to act. It must be remembered, however, that the charter of the Laurel Run Improvement Company (now the Philadelphia & Reading Coal & Iron Company) was passed by the Legislature with full knowledge that it was in the interest of the Philadelphia & Reading Railroad Company. Every other railroad company whose road entered the anthracite region had the privilege of owning and working coal lands, and there was no valid reason why it should be withheld from the Reading. It was also believed that only in this way could the trade be kept from being diverted to other States and a discrimination in the price of coal against Philadelphia be averted, and the results have, in fact, justified that belief.

Hannibal & St. Joseph.

The United States Circuit Court has granted a temporary injunction restraining the counties along the line of this road from collecting the taxes levied upon the property. The injunction, however, is not to interfere with the progress of the suits pending to enforce payment.

Pullman Car Company.

A shed for storing cars 800x30 feet has been erected at Aurora, Ill., with a double track, and 16 coaches are laid up in it. Some of them are to be overhauled and repaired.

Atlantic, Mississippi & Ohio.

An Amsterdam letter of Jan. 16 says that the scheme of arrangements approved by the London holders is not liked in Amsterdam, where most of the bonds are held.

California Pacific Extension.

The Amsterdam committee of bondholders ask for deposits of bonds to carry out an agreement with the Central Pacific by which the latter agrees to give \$2,000,000 6 per cent. bonds with its own guarantee for the \$3,600,000 Extension bonds.

Missouri, Kansas & Texas.

The Amsterdam bondholders' committee announced Jan. 15 that they had not agreed with the company and that the question of payment of interest on the funded coupons had been deferred from the 12th to the 26th, for the decision of the courts. In December the price fell from 41 to 34%, and thereafter it fluctuated between 34% and 38%, being 37 Jan. 15.

Chicago & Northwestern.

An Amsterdam letter of Jan. 16 says that the public there was investing heavily in this company's securities, and prices were advancing rapidly.

ANNUAL REPORTS.

Worcester & Nashua.

This company owns and works a line from Worcester, Mass., northeast to Nashua, N. H., 45.68 miles; there are on this line 16.84 miles of second track. It also works under lease the Nashua & Rochester road, from Nashua northeast to Rochester, 49 miles, the operations of which are not included in the report.

At the close of the last fiscal year, Sept. 30, 1875, the property was represented as follows:

Stock (\$39,181 per mile).....	\$1,789,800
Bonds (\$21,891 per mile).....	1,000,000

Total (\$61,072 per mile)..... \$2,789,800

The annual interest charge is \$67,750, or \$1,483 per mile. There is no floating debt, the cash and balances due largely exceeding all bills payable and other balances owing. The cost of road is reported at \$2,067,054.13, or \$45,248 per mile; of equipment, \$405,086.03, or \$8,986 per mile. These accounts were increased during the year by \$15,952.74 for new cars and \$66,297.32 for construction, most of which was for the Worcester Viaduct. The company holds \$212,525 Nashua & Rochester stock, and has endorsed the bonds of that company.

The equipment consists of 21 engines and 5 snow-plows; 3 drawing-room, 19 passenger and 7 mail and baggage cars; 197 eight-wheel box, 41 four-wheel box, 100 platform and 100 coal and gravel cars.

The work done for the year was:

	1874-75.	1873-74.	Decrease.	P. c.
Train mileage.....	311,953	328,771	16,818	5.1
Passenger carried.....	342,134	359,416	17,262	4.8
Tons freight moved.....	312,006	335,913	23,810	7.1

The earnings were as follows:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Passenger.....	\$175,965 59	\$180,567 29	Dec. \$4,601 70	2.5
Mail and express.....	14,750 76	14,830 70	Dec. 79 94	1.9
Freight.....	265,212 36	290,342 63	Dec. 44,130 27	14.7
Car service.....	12,065 70	45,155 88	Inc. 3,324 98	7.4
Rents, etc.....	36,418 12	.....	.....	.....

Total..... \$494,409 53

Expenses and taxes..... 336,079 21

Net earnings..... \$158,330 32

Gross earn. per mile..... \$10,823

Net earn. per mile..... 7,466

Per cent. of expenses..... 67.98

Per cent. of gross..... 68.35

Dec. 0.37

General depression in business and increased competition account sufficiently for the decrease in earnings. The expenses have been reduced by care and economy; since the close of the year a further reduction of 10 per cent. in all salaries has been made. A considerable amount had to be paid for damages from fires caused by the carelessness of an engineer in running with an engine he knew to be defective; the amount is included in expenses.

The construction of the viaduct in Worcester has progressed well. The second track on the road now extends from Worcester to Clinton, 17 miles. During the year 586 tons of steel rails, 216 tons of re-rolled iron and 15,212 ties have been used in repairs. The yards at Worcester, Nashua and Ayer Junction have been enlarged. The equipment has been well kept up.

The income account is as follows:

Surplus Oct. 1, 1874.....	\$265,455 31
Net earnings.....	158,330 32
Premium on bonds sold.....	20,000 00

Total..... \$436,785 63

Interest..... \$31,438 87

Dividends, 8½ per cent..... 152,133 00

Interest..... 188,571 87

Surplus, Oct. 1, 1875..... \$280,213 76

Showing a decrease of \$5,241.55 during the year.

Concerning the Nashua & Rochester lease, the report says:

"The Nashua & Rochester Railroad was opened for business Nov. 24, 1874. Two passenger trains and one freight train have been running daily each way in connection with trains over this road, also, in connection with the trains over the Portland & Rochester Railroad, making a through line from Worcester to Portland.

"The receipts have been light, yet sufficient to pay running

expenses, the business steadily increasing from month to month.

"It will take time to develop its resources, and bring to notice its natural advantages over other lines for business communication to both.

"The Worcester & Nashua Railroad Company under its lease of the Nashua & Rochester Railroad may have some burden to bear until such time as the earnings of that road, together with the increased earnings of its own road, derived from its business connections with that road, shall be sufficient to pay the interest (6 per cent.) on its cost and operating expenses.

"The construction of the Nashua & Rochester Railroad was a necessity that presented itself to many of the large stockholders, as well as to the directors of this company.

"Four new railroads were in progress of construction which, evidently, would have a tendency to divert much of the business of this road by sharp and unprofitable competition over other lines to points common to both, making it necessary for us to seek and make connections with other lines, from whom we could with confidence expect business in the future."

Providence, Warren & Bristol.

This company owns a road from Providence, R. I., southeast to Bristol, 13.6 miles; there are 3 miles of sidings and other tracks.

The property is represented as follows:

Stock (\$2,200 per mile).....	\$437,920
Bonds (\$3,676 per mile).....	50,000

Total (\$35,876 per mile)..... \$437,920

The bonds bear 8 per cent. interest, making an annual charge of \$294 per mile. A controlling interest in the stock is owned by the Boston & Providence Company.

The earnings and expenses for the year ending Nov. 30 were as follows:

	1874-75.	1873-74.	Inc. or Dec.	P. c.
Gross earnings.....	\$108,300			

three months the gross income would show a decrease of \$51,254.52, and the net income a decrease of \$31,711.77.

The road-bed has been improved, and on the Pittsburg road 29 miles of new rails have been laid and 6,996 feet new sidings built; a new freight house has been built in Boston, and extensive additions to the Charlestown wharf contracted for. On the Vermont & Massachusetts 6,174 feet new sidings have been laid, three new wooden and one iron bridge built and other bridges repaired; a contract has been made for straightening the road so as to avoid the reverse at Ashburnham.

These improvements have mainly been made with a view to the increased business coming to the road from the opening of the Hoosac Tunnel. The last Legislature adopted the "gate" plan and released this company from the old contract under which it was to receive all the business of the tunnel line and to pay the State 20 per cent. of its gross earnings from such business, and the tunnel is now open to all companies desiring to make connections with it. The benefits anticipated have not yet been felt, owing to the delay in opening the tunnel and the present restrictions on its use. The report says, in conclusion: "The freight business is limited in quantity and to particular hours, to avoid delaying the work, and for the same reason the passenger trains are confined to such hours that no direct connection can be made upon either side of the mountain.

"The business pays the regular tolls fixed by the State for running over the Troy & Greenfield Railroad east of the mountain, and is also burdened by a tax of 75 cents per passenger, and \$1.50 per loaded freight car, for each person and for each loaded freight car which the contractor draws through the Tunnel.

"Subject to these restrictions and charges, we cannot expect to perform a large or profitable business. Still, enough has been done to satisfy us that whenever trains can be run through the Tunnel without delay, at fair tolls, making proper connections, a very large business will seek this new line to the West."

"We hope the Tunnel will soon be completed; for, until that time, we cannot realize the benefits or profits which we believed would result from leasing the Vermont & Massachusetts Railroad."

Huntingdon & Broad Top.

This company owns a line from Huntingdon, Pa., to Mount Dallas, 45 miles; Shoup's Run Branch, 9.25 miles; Six Mile Run Branch, 4.5 miles; total owned, 58.75 miles.

This property is represented as follows:

Stock (\$34,013 per mile).....	\$1,998,250
First mortgage bonds.....	416,000
Second " "	967,500
Third " "	1,370,000
Coupon Scrip.....	150,955
Total bonded debt (\$30,037 per mile).....	\$2,293,485
Total (\$73,050 per mile).....	\$4,291,715

The interest on the third-mortgage bonds is not paid, under an arrangement with the bondholders.

For the year ending Dec. 31 the work done was as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Passengers carried.....	51,407	73,892	Dec. 22,465	30.4
Tons coal carried.....	380,075	298,056	Inc. 82,019	27.5
Tons freight carried.....	105,383	87,183	Inc. 18,200	20.6

The earnings for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Coal \$210,912 19	\$239,074 83	Inc. \$49,055 37	26.8	
Other freight..... 77,781 01	87,755 19	Dec. 9,016 76	25.9	
Passenger..... 28,738 43	37,755 19	Dec. 2,529 69	32.0	
Mail, express, etc. 6,361 03	7,890 66	Dec. 1,529 69	32.0	
Total..... \$322,829 66	\$284,720 68	Inc. \$38,108 98	13.4	
Working expenses..... 157,349 54	184,201 34	Dec. 26,861 80	14.6	
General office expenses and taxes..... 28,050 12	16,220 00	Inc. 11,830 12	73.0	
Total..... \$185,399 66	\$200,421 34	Dec. \$15,021 68	7.5	
Net earnings..... \$137,430 00	\$84,299 34	Inc. \$53,130 66	63.0	
Gross earnings per mile..... \$5,495	\$4,846	Inc. \$649	13.4	
Net earnings per mile..... 2,339	1,435	Inc. 904	63.0	
Per cent. working expenses..... 49.74	64.70	Dec. 15.96	24.7	
Per cent. all expenses..... 57.43	70.39	Dec. 12.96	18.4	

There has been an encouraging increase in the coal business and the coke traffic is now being established on a firm basis, the latter being a clear gain, as much of the slack coal and waste is utilized in the coke manufacture.

The income account was as follows:

Net receipts.....	\$137,430 00
Interest paid.....	\$67,663 42
New bridges and depots.....	24,467 73
Mine improvements.....	5,249 00
Paid in reduction of floating debt.....	26,346 54
Balance.....	128,726 74

It seems reasonably sure to the managers that the time is approaching when the payment of interest on the third-mortgage bonds can be resumed, although it is impossible to fix a definite date. As soon as it can be done with safety a certain coupon will be designated on which payment will be begun, and the unpaid coupons will be funded, in accordance with the agreement. It must be remembered that the improvements to the road within the past few years have amounted almost to its reconstruction, and that almost entirely new equipment has been provided.

Boston & Lowell.

This company works the following lines:

Main line Boston to Lowell, double track.....	26.75
Mystic River Branch.....	2.25
Lexington & Arlington Branch.....	9.5
Woburn Branch.....	2.00
Stoneham Branch.....	2.50
Lawrence Branch.....	3.25
Total owned.....	46.00
Lowell & Lawrence R. R., leased.....	13
Salem & Lowell R. R., leased.....	16
Middlesex Central R. R., leased.....	8
Total.....	37.00

At the close of the fiscal year, Sept. 30, 1875, the capital account stood as follows:

Capital stock (\$70,652 per mile owned).....	\$3,250,000
Bonded debt (\$36,946 per mile).....	1,699,500 00
Notes payable (\$24,322 per mile).....	1,118,800 00
Sundry balances and coupons of Oct. 1.....	43,800 36
Contingent fund.....	206,245 71
Total.....	\$8,408,348 07

Since then a further issue of \$750,000 bonds has been authorized for the purpose of funding the floating debt. During the past year \$500,000 7 per cent. bonds, authorized in 1874, were

sold at a premium of about \$26,000. The company owns a large amount of real estate in and near Boston.

The earnings for the year were as follows:

Passengers.....	1874-75. \$149,924.70	1873-74. \$16,262	Inc. or Dec.	P. c.
Freight.....	572,064.68	699,250.93	Dec. 12,195.26	18.2
Mails, exp'ns, etc.	31,859.74	30,920.05	Dec. 1,020.69	3.3
Total.....	\$1,153,849.12	\$1,206,917.11	Dec. \$142,067.99	11.0
Working exp'ns	509,224.55	583,320.03	Dec. 45,904.52	5.1
Taxes.....	60,565.88	44,544.65	Dec. 15,821.26	36.7
Total.....	\$1,000,000.43	\$937,864.68	Dec. \$62,225.75	6.6

Net earnings.... \$153,758.09

Gross earnings per mile..... \$13,993

Net earnings per mile..... 1,883

Per cent. of expenses..... 81.40

Per cent. exp'ns and taxes..... 86.67

The decrease in earnings was both in through and local business and more especially in freight. The Lawrence Branch has brought in a fair return on its cost, although it suffers from want of better station accommodations at Lawrence.

During the year, passenger trains ran 498,196, and freight trains 44,239, a total of 912,424 miles, being an increase over the previous year of 42,375 miles, or 4.8 per cent. During the year all salaries have been cut down as much as possible, and an effort made to cut off superfluous service and reduce expense in every possible way. The Mystic River wharves already show a good return, and it is evident that they will be of great advantage to the company.

The income account for the year is as follows:

Net income..... \$153,758.09

Interest on sinking funds..... 11,801 65

Drawn from contingent fund..... 151,615 02

Total..... \$317,175.96

Rentals paid..... \$78,486.73

Interest paid..... 119,840 99

Adjustment of old balances on joint account..... 77,790 00

Vermont Central, losses on Ogdensburg & Lake Champlain and Northern Transportation Co. contract..... 41,078 24

Total..... \$171,175.96

The rentals and interest exceeded the net earnings by \$44,549.03; deducting the interest received, the deficit was \$92,747.38, making it necessary to draw that amount from the contingent fund to square the accounts for the year. The amount (\$118,868.24) needed to adjust the old balances, and the Vermont Central contract also had to be drawn from the contingent fund.

The report says: "The complications growing out of contracts with the upper roads for business going over our line have been found very difficult of adjustment. The directors are impressed with the very great importance of having the business closed up each six months, both as to profit and loss, and this is impossible so long as balances for connecting business remain unsettled. The failure to make a final adjustment of claims growing out of connecting business in past years has occasioned the charging into the expenditures of the present year of a large sum properly chargeable to the expenses of former years. The extremely low rates for which much of the through connecting business has been done render the claims made for expenses incident to such business disproportionate to the benefit received and inconsistent with financial propriety. The directors are taking especial pains to adjust all these disputed claims, so that, with payment of whatever may be found justly due, all future payments to secure unremunerative business may be avoided. Besides the diminished traffic of the past year, the peculiar relations of rival roads have caused an increase of train mileage in order to prevent the serious loss of our legitimate business. Efforts to diminish this mileage, without materially lessening the receipts, are being carefully made, and it is hoped that a large net saving to the corporation may be thus secured." *

The directors would again call special attention to the fact that the contract with the Nashua & Lowell Railroad Corporation, for the joint operation of the road, expires by its own limitation in little more than two years. The relations of the two roads resulting of necessity from their location, their joint ownership of valuable properties essential to the interests of both corporations, and the fact that they can be operated vastly cheaper together than separately, would all seem to render it of vital importance that a further agreement for union should be perfected upon equitable terms."

Lehigh Valley.

This company works a main line from Easton, Pa., northwest to Wilkesbarre, 101 miles, with branches from Penn Haven Junction to Andenreid, 18½ miles; from Black Creek Junction to Mount Carmel, 30½ miles; from Penn Haven to Tomahicken; from Hazleton to Milneville, and a network of shorter coal branches, making the total mileage, as given in the report, as follows:

	Miles.
Main Line and branches.....	251.65
Second track.....	88.55
Second track laid, but used as sidings.....	15.33
Sidings.....	128.69

Total, rated as single track..... 463.52

Of this 128.21 miles are laid with steel rails, of which 23.62 miles were so laid during the year. There are 7.5 miles of second track graded and ready for the rails. The company leases 9.6 miles of the Pennsylvania & New York road, from Wilkesbarre to Bloomsburg Junction. It also owns the Easton & Amboy road, which extends its main line from Easton across New Jersey to tide-water at Perth Amboy, 60 miles, and a large and controlling share in the Pennsylvania & New York road, which extends northward to the Erie at Waverly.

The report of the President, Hon. Asa Facker, for the year ending Nov. 30 says: "The almost universal suspension of labor in the coal regions tributary to our road, which began about Jan. 1, and continued for more than six months, had the effect of reducing to a considerable extent the business for the past year. Our total anthracite coal tonnage, 1,939,296 tons were carried during the last four months, showing a capacity for a yearly tonnage of nearly 6,000,000 tons with our present equipment." *

"Our total anthracite coal tonnage for the past fiscal year was 3,277,572 tons; that for 1874 was 4,150,660 tons, being a decrease of 873,088 tons. In addition we carried of bituminous coal 55,900 tons, and in 1874, 26,622 tons, being an increase of 29,278 tons. Showing a total coal tonnage of 3,333,472 tons, and in 1874, 4,177,282 tons, a net decrease of 843,810 tons.

"The receipts from all sources, including interest from investments, net income from coal lands, etc., amounted to:

Total receipts..... \$7,515,067.98

Working expenses of the road..... 3,262,861.97

Net income..... \$4,252,206.01

"While the gross income has fallen off \$18,899.42 from that for 1874, the operating expenses have been reduced \$206,554.44.

"After charging all expenses, interest on bonds and dividends, the business of the year shows a loss of \$93,053.56, which has been taken from our reserve fund.

"The usual quarterly dividends, amounting to 10 per cent. per annum, have been paid on the preferred and common stocks.

"At the close of our fiscal year our capital account was as follows:

Preferred and common stock, including scrip installments..... \$27,002,297.50

Six per cent. bonds (coupons and registered) due in 1876..... \$5,000,000

Seven per cent. registered bonds, due in 1910. 6,000,000

Consolidated mortgage bonds, sterling..... 4,900,000

" " " " coupon..... 2,000,000

" " " " registered..... 3,913,000

" " " " annuity..... 316,000

Total..... 22,126,000.00

Floating debt, less cash on hand..... 249,221,297.50

None.

"It will be observed that a considerable increase has been made since last report in both stock and